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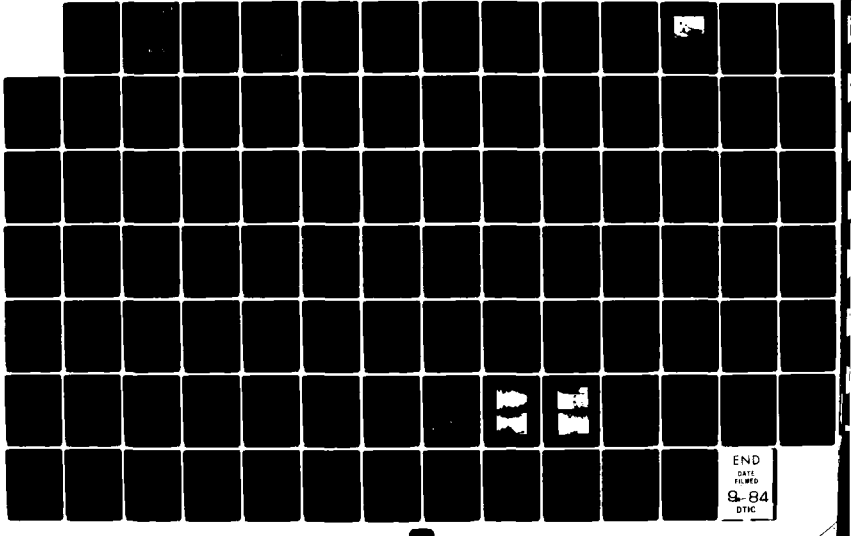

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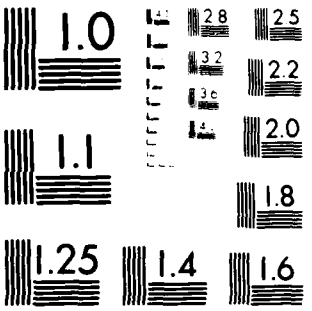
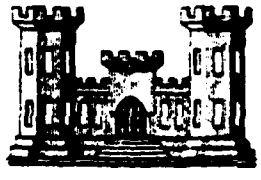


CONNECTICUT RIVER BASIN
MIDDLEFIELD, CONNECTICUT

BESECK LAKE DAM

CT 00381

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

JANUARY 1979

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Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Connecticut River Basin
Middlefield, Connecticut

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Beseck Lake Dam is an ashlar masonry and earth embankment dam about 36 ft. high. It is curved and is about 285 ft. long. Beseck Lake is about 4,700 ft. long and has a surface at normal storage of 112 acres. The dam is thus classified as intermediate in size. Because failure might damage some homes, local roads, and a State Highway, the dam has been classified in the significant hazard potential category. The spillway is adequate to pass the ½ PMF test flood outflow of about 2,150 cfs without overtopping the earth dikes on the non-overflow abutments.

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BESECK LAKE DAM

CT 00381

CONNECTICUT RIVER BASIN
MIDDLEFIELD, CONNECTICUT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No.	CT 00381
Name of Dam:	Beseck Lake Dam
Town:	Middlefield
County and State:	Middlesex County, Connecticut
Stream:	Ellen Doyle Brook
Date of Inspection:	8 November 1978

BRIEF ASSESSMENT

Beseck Lake Dam is an ashlar masonry and earth embankment dam about 36 ft. high. It is curved and is about 285 ft. long. An earthfill forms the upstream face of the dam, the downstream face being of masonry. The spillway occupies the central 98.5 ft. of the crest length. The non-overflow sections each side of the spillway have earth dikes on top of the masonry. A 20 in. dia. outlet pipe projects through the downstream face of the dam. Flow regulation is by means of a 24 in. dia. sluice gate and stoplogs in a concrete control structure. The dam and lake are owned by the State of Connecticut and used for recreational purposes.

Beseck Lake is about 4,700 ft. long and has a surface at normal storage of 112 acres. The drainage area is about 2 square miles and the active storage is about 1,900 acre-ft. at normal storage level and 2,600 acre-feet at top of dam. The dam is thus classified as intermediate in size. Because failure might damage some homes, local roads, and a State Highway, the dam has been classified in the significant hazard potential category.

Riprap on the upstream face is missing in the vicinity of the catwalk to the outlet tower, causing erosion to occur. There are a number of leaks through the masonry downstream face and at the foundation level. A disused outlet pipe is also leaking. There is some excessive growth on the crest of the dam, on the masonry downstream face and in the downstream channel. The outlet pipe is of inadequate size for rapid evacuation of the reservoir. The dam appears to be in a generally good condition.

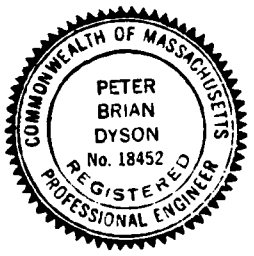
The spillway is adequate to pass the ½ PMF test flood outflow of about 2,150 cfs without overtopping the earth dikes on the non-overflow abutments.

Within two years of receipt of the Phase I Inspection Report, the owner should retain the services of a registered professional engineer to make further investigations, and should implement the results. These studies should cover: (1) whether strengthening the dam would be advisable; (2) whether some protection against scour from the spillway jet is needed at the toe of the dam; (3) whether the outlet facilities are of adequate size; (4) how serious the leakage is and the feasibility of sealing the leaks; and (5) the stability of the steep slopes of Beseck Mountain.

The owner should also implement the following measures: (1) eliminate and control growth on the dam and in the downstream channel; (2) monitor leaks on a monthly basis; (3) level the tops of the two abutment dikes; (4) repair riprap on the upstream face; (5) institute procedures for a biennial periodic technical inspection; and (6) develop a surveillance, flood warning and emergency evacuation plan.

Peter B. Dyson
Project Manager

Frederick Esper
Vice President



This Phase I Inspection Report on Beseck Lake Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

CHARLES G. TIERSCH, Chairman
Chief, Foundation and Materials Branch
Engineering Division

FRED J. RAVENS, JR., Member
Chief, Design Branch
Engineering Division

SAUL COOPER, Member
Chief, Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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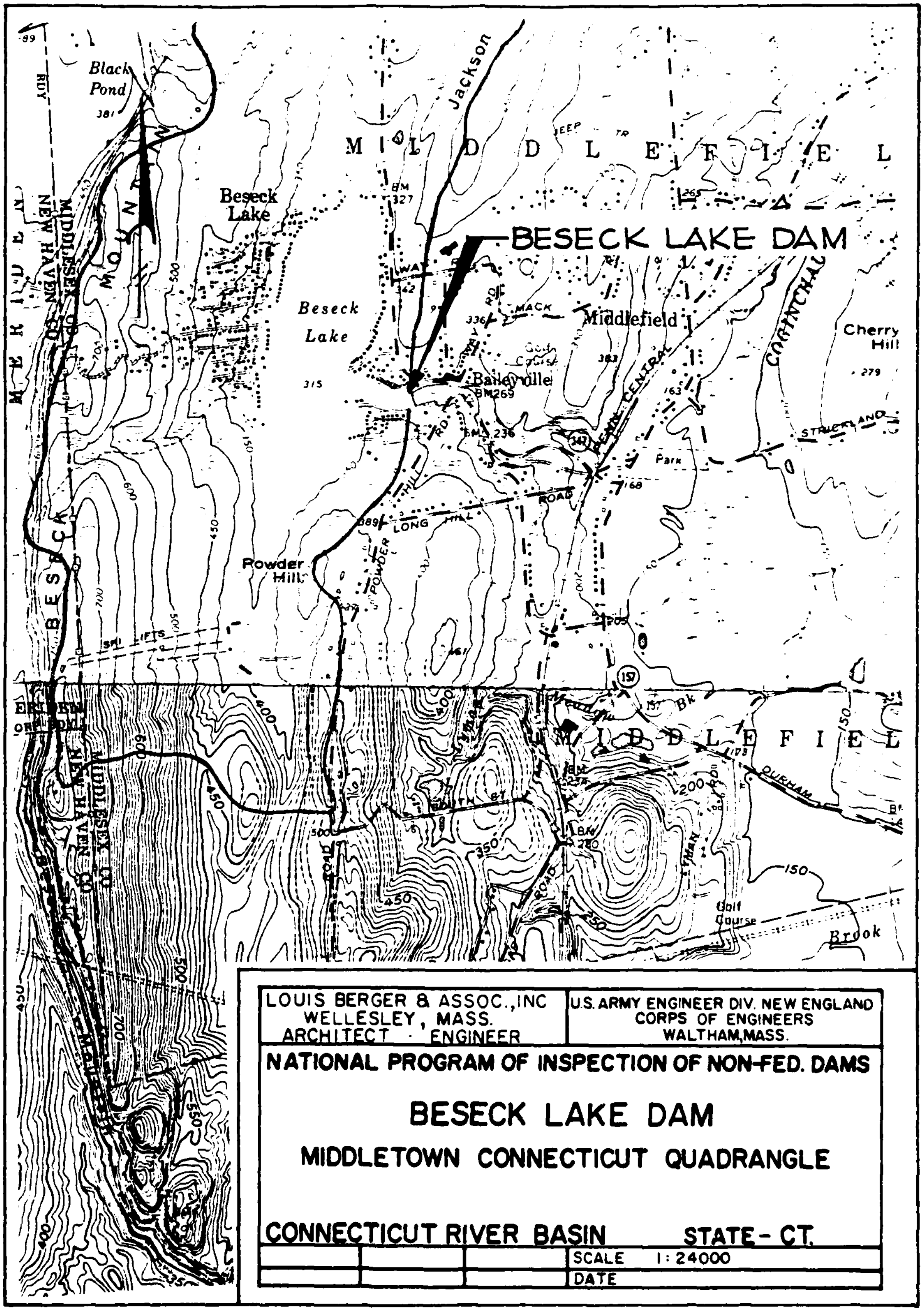
BESECK LAKE DAM

Overview from right abutment



LOUIS BERGER & ASSOC., INC
WELLESLEY, MASS.
ARCHITECT · ENGINEER

U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

BESECK LAKE DAM

MIDDLETOWN CONNECTICUT QUADRANGLE

CONNECTICUT RIVER BASIN STATE - CT.

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PHASE I INSPECTION REPORT

BESECK LAKE DAM CT 00381

SECTION 1 - PROJECT INFORMATION

1.1 General

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Louis Berger & Associates, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to Louis Berger & Associates, Inc. under a letter of 27 October 1978 from Max B. Scheider, Colonel, Corps of Engineers. Contract No. DACW33-78-C-0371, Job Change No. 1, has been assigned by the Corps of Engineers for this work.

b. Purpose

1. Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

2. Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.

3. Update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location

Beseck Lake Dam is located near the community of Baileyville in the town of Middlefield, about halfway between Middletown and Meriden in Middlesex County, Connecticut. The dam is reached via State Highway 66, 3.8 miles east from Meriden, and then south 1.6 miles

on State Highway 147. The dam is situated on Ellen Doyle Brook, a tributary of the Coginchaug River, which joins the Connecticut River 7.5 miles downstream near the northern outskirts of Middletown. The normal storage level of the lake is 315 MSL, while the confluence of Ellen Doyle Brook and the Coginchaug River a mile downstream is about 145 MSL.

b. Description of Dam and Appurtenances

1. Description of Dam

Beseck Lake Dam is an ashlar masonry and earth embankment dam constructed across a 300 ft. wide, steep-sided valley reach on Ellen Doyle Brook, at a point about 1,000 ft. downstream from the main body of Beseck Lake. The dam is about 36 ft. high and is curved on a radius of about 180 ft., with a central angle of about 90 degrees. The arc length at the top of the dam is about 285 ft., the chord span is about 255 ft., and the crown height is about 50 ft. The length to height ratio is about 7.5 to 1. The top thickness of the masonry dam at the center spillway section is 12.5 ft. The thickness of the non-overflow section could not be determined since it is covered on top and upstream with an earthfill dike. The downstream masonry face of the dam slopes on about ½ in. per ft. of height. The slope of the upstream masonry face could not be ascertained. The top of the masonry capstone at the abutments is higher than that at the spillway section by about 1 ft.

An earthfill covers the upstream face of the masonry dam, extending on a 4 to 1 slope upstream from the center spillway section and on variable slopes upstream from the non-overflow abutments. The top of the earthfill at the left abutment section is about 4 ft. 2 in. higher than the spillway level; the top of the right abutment fill is about 3 ft. 10 in. higher. Concrete retaining and guide walls are placed on each side of the center spillway section to retain the higher level embankments.

Bedrock is visible along the abutments in isolated areas downstream from the dam, and it is presumed that the masonry dam was founded on bedrock. Apparent seepage at ground contact level indicates that in all probability no grouting or other foundation treatment was employed. A plan and profile sketch of the dam is shown on Sheet D-1, Appendix D. A general location drawing is included in Appendix B.

2. Spillway

The spillway for Beseck Lake Dam occupies the central portion of the crest length, being a 98.5 ft. long broad crested overflow, of which 90.5 ft. is at elevation 315.0 MSL; the remainder consists of two 4 ft. long by 12 in. high end fillets. End abutment walls at each end of the overflow crest confine the approximately 4 ft. high non-overflow earth embankments at each abutment. The upstream embankment surface is riprapped on a 4 to 1 slope. Downstream from the crest the flow is free falling and impinges on the abutment slopes and valley floor. No surface protection has been provided downstream from the dam to absorb the impact of the overflowing jet. Nevertheless, no serious erosion or plunge pool has been formed from past discharges over the spillway.

3. Outlet Works

The reservoir outlet is located about 40 ft. to the left of the left abutment of the spillway section. The outlet consists of a 20 in. internal dia. concrete lined steel pipe with invert level at its outlet end at elevation 296.80, which is about 16 ft. above the toe of the dam at its maximum section. A control structure, built in 1972 to replace an earlier intake structure, is located about 35 ft. upstream from the left abutment embankment. It contains an inlet gate and slots for stoplog insertions. Upstream from the intake well structure, a 24 in. dia. reinforced concrete pipe continues to an inlet headwall located at the upstream toe of the embankment. The invert of this inlet pipe is at elevation 298.2. Flow regulation can be obtained by opening the slide gate at the inlet to the well, and by inserting stoplogs to a level which will provide a drop inlet control, the required overflow head over the stoplog being adjusted for specific releases.

The 20 in. dia. lined outlet pipe is carried through the masonry dam and projects about 1 ft. beyond the face. Flow from the outlet pipe discharges directly onto the downstream abutment, which is generally exposed bedrock. No excessive scour was noticed along this slope. The downstream channel is rather heavily overgrown with dense brush and saplings.

c. Size Classification

Beseck Lake Dam is about 38 ft. high, impounding a maximum storage of about 1,900 acre-ft. to spillway crest level and about 2,400 acre-ft. to top of dam. In accordance with the size and capacity criteria given in Recommended Guidelines for Safety Inspection of Dams, storage governs and therefore the project is classified as intermediate in size.

d. Hazard Classification

A breach failure of Beseck Lake Dam with the water level to the top of the dam would release water down the Ellen Doyle Brook, across and along State Highway 147, through the Penn Central R.R. overpass at Baileyville and then into the Coginchaug River. The Coginchaug River at this confluence flows through a wide flat meadowland area to Wadsworth Falls, more than a mile downstream. Except for one or two homes near the road crossing at Baileyville and about 6 homes below the railroad underpass, which are in the stream flood plain area, no other properties along the brook or Coginchaug River appear to be threatened by a major flood from a failure of the dam. Since there is some potential for loss of life and damage to highways and a railroad, in accordance with the Recommended Guidelines for Safety Inspection of Dams, Beseck Lake Dam has been classified as having a significant hazard potential.

e. Ownership

The Beseck Lake Dam is owned by the State of Connecticut, Department of Environmental Protection, Water and Related Resources Section.

f. Operator

Mr. John Spencer, Regional Manager
Department of Environmental Protection, Region 3
209 Hebron Road
Marlborough, CT 06447

Telephone: (203) 295-9523

g. Purpose of Dam

The dam impounds a lake used for recreational purposes.

h. Design and Construction History

It has been indicated that the original dam at this site was built as early as 1846. Remnants of an old dam about 8 ft. high downstream from Beseck Lake Dam suggest that the facilities may have been operated originally as a mill dam or for waterwheel power generation. No information was recovered regarding the design or construction of the dam.

The outlet works intake and control tower of earlier construction were reported in 1957 to be in good condition. However, in 1970 it was deemed necessary to replace the outlet tower and control gate, and this work was completed in 1972 (see Appendix B).

The top of the capstone of the downstream masonry face of the dam abutments is 2 ft. higher than the spillway crest. It is therefore speculated that the original dam may have been a simple masonry arch without the present capping embankment and upstream fill. This fill may have been added after the original construction as a means of sealing leakage through the masonry dam and its foundation, and/or for raising the non-overflow abutments to a higher freeboard.

i. Normal Operational Procedure

There are no formal operational procedures. According to State DEP Region 3 staff, the lake is usually kept full to the crest of the spillway, but is occasionally lowered at the request of lakeside residents to facilitate boat dock maintenance, and at the request of the State Fish and Game Department for purposes of fish culture. The lake is not drawn down in anticipation of floods.

1.3 Pertinent Data

a. Drainage area

The drainage area contributing to Beseck Lake is mainly that from the east slope of Beseck Mountain, draining into the lake through six small tributaries which enter the lake from the north, west and east. These tributaries vary from ½ to 1 mile in length, with gradients from 116 ft. per mile to 623 ft. per mile. In the aggregate the average length of the inlet streams is about 3/4 mile, with an average gradient of 330 ft. per mile.

The drainage area measures 2.05 square miles, being 2.5 miles in lateral extent and about 0.8 miles in width. The drainage area is confined by Beseck Mountain to the west and Jackson Hill and Powder Hill to the east. The northern side of the area is a saddle which forms a common boundary with the Mount Higby Reservoir drainage area to the north. Beseck Mountain rises to about elevation 730, or about 400 ft. above the lake elevation 315. Powder Hill and Jackson Hill rise to about elevation 500. The Beseck Mountain slope is forested, but many homes of Beseck Lake community dot the hillside.

b. Discharge at Damsite

1. Outlet Works

Release of stored waters at Beseck Lake Dam is provided through the 20 in. dia. outlet pipe through the dam. Control of this outflow is regulated at the outlet tower, by means of 6 ft. long stoplogs inserted in slots about midpoint in the width of the tower well, and by opening the inlet gate at the upstream side of the well.

The invert of the inlet pipe to the tower well is at about elevation 298, providing for evacuation of only the top 17 ft. of reservoir storage. No low level outlet has been provided. Computations show that about 45 cfs. can be released with reservoir level to top of dam, elevation 319 (see Sheet D-3, Appendix D).

2. Maximum Flood at the Damsite

No records are available of flood inflows into Beseck Lake, nor of spillway releases and surcharge heads during such inflows.

3. Ungated Spillway Capacity at Top of Dam

The spillway for Beseck Dam occupies the central portion of the dam, being a broad crested overflow with a free-falling downstream jet. The total length of the overflow section is 98.5 ft. Computations give a spillway capacity of about 2,200 cfs with reservoir to the top of the earthfill embankment on the right abutment, elevation 318.8. Computed discharges through the spillway and over the abutments are shown on Fig. 1, Sheet D-2 and Sheet D-3, Appendix D.

4. Ungated Spillway Capacity at Test Flood Elevation

   The spillway capacity is about 2,150 cfs at test flood elevation 318.75.

5. Total Project Discharge at Test Flood Elevation

   Since the dam is not overtopped by the test flood, the total project discharge is the same as the spillway discharge: 2,150 cfs at elevation 318.75.

c. Elevation (ft. above MSL)

   1. Streambed at centerline of dam - 281±
   2. Diversion tunnel - None
   3. Spillway crest - 315.0
   4. Top of dam - 318.83± (right abutment), 319.17± (left abutment)
   5. Test flood design surcharge - 318.75

d. Reservoir

   1. Length of maximum pool - 4,700 ft.
   2. Average width of pool - 1,050 ft.

e. Storage (acre-ft.)

   1. Spillway crest pool - 1,900
   2. Test flood pool - 2,600
   3. Top of dam - 2,600

f. Reservoir surface (acres)

   1. Spillway crest - 112
   2. Test flood pool - 128
   3. Top of dam - 128

g. Dam

   1. Type - Curved ashlar masonry with upstream earthfill embankment
   2. Length - 285 ft.
   3. Height - 38 ft.
   4. Top width - 12.25 ft. masonry dam
      6 ft. min. for abutment embankment
   5. Side slopes - Near vertical downstream face of masonry dam, 2 to 1 average upstream embankment slope
   6. Zoning - Ashlar masonry dam downstream, earthfill upstream

7. Impervious core - Ashlar masonry downstream facing
8. Cutoff - Not known
9. Grout curtain - None (assumed)

h. Spillway

1. Type - Overflow across masonry dam, free-falling jet
2. Length of weir - 98.5 ft.
3. Crest elevation - 315.0 MSL
4. Ungated
5. Upstream channel - 4 to 1 slope of upstream embankment
6. Downstream channel - None
7. General - No surface protection at toe of dam, point of impact of falling jet. No eroded pool below spillway. Bedrock is visible along abutments below spillway.

i. Regulating outlets

1. Entrance invert - Elev. 298.2
2. Exit invert - 296.8
3. Entrance pipe size - 24 in. dia.
4. Exit pipe size - 20 in. dia.
5. Description - 20 in. dia. pipe through dam regulated by 24 in. dia. upstream seal slide gate and by removable stoplog wall inserted in center of well to form a drop inlet. Head controlled by height of stoplog wall.

SECTION 2 - ENGINEERING DATA

2.1 Design

No data on the design of the dam or the outlet structure which was replaced in 1972 has been recovered and probably none exist. Copies of the location plan, longitudinal section and specifications for the present outlet structure are included in Appendix B. These were prepared in 1971 for the State Public Works Department by the engineering firm of Macchi & Hoffman, Hartford, CT. No reasons for replacement of the outlet structure have been found in the files examined.

2.2 Construction

No information was recovered regarding construction of the original dam, said to have been in 1346, or of subsequent repairs or modifications which may have been carried out before 1972. The dam was repaired and the outlet structure was replaced in 1972. The specifications in Appendix B cover this repair work.

2.3 Operation

Operation of the dam by the State DEP, Region 4, is on an informal, ad hoc basis to satisfy the recreational interests of lake users.

2.4 Evaluation

a. Availability

Since no engineering data for the dam is available, it is not possible to make an assessment of the safety of the structure. The basis of the information presented in this report is principally the visual observations of the inspection team.

b. Adequacy

Without any engineering data, a definitive review and assessment of this dam is impossible. The evaluation is based primarily on visual inspection and engineering judgment.

c. Validity

Not applicable.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General

The visual inspection of Beseck Lake Dam took place on 8 November 1978. The reservoir was at about elevation 311, or about 4 ft. below spillway crest level. There was a small discharge of about 40 gpm from the outlet pipe. According to the State DEP Region 3 representative, the lake had been drawn down to accommodate shoreline property owners wishing to repair their boat docks. The dam appeared to be in a generally good condition.

b. Dam and Spillway

The curved dam is about 285 ft. long and has an ashlar masonry downstream face, and an earthfill on the upstream face. The central portion of the crest length forms a broad crested spillway 98.5 ft. long. The masonry is 12.5 ft. thick at the spillway, but its thickness at the abutments could not be determined. An earthen dike at both abutments covers the top of the masonry. The upstream face of the spillway section is riprapped with crushed stone on a 4 to 1 slope from the spillway crest. The upstream slopes of the non-overflow abutment sections are variable at about 2 to 1 and partially riprapped (see Overview Photo & Appendix C, Photo Nos. 1 & 2). Left of the spillway near the tower catwalk, the upstream slope is badly eroded, and is unprotected by riprap, although elsewhere the slope is given moderate protection by rather small 6 in. stone.

The embankment crest left of the control structure is badly overgrown, and the State's representative for Region 3 advised that the control of vegetation is increasingly difficult since the ban on herbicides. The downstream stone facing is also becoming covered with light growth, nourished by moisture passing through the dam (Appendix C, Photo No. 3)

Several leaks through the downstream face of the dam were evident. One near the left abutment has, according to the State's representative, persisted for many years but has not increased in volume, which appeared to be about 0.1 gpm. Other leaks in the stone facing, all

less than 0.1 gpm, and clear, are located: beneath the spillway, some 20 ft. left of its right wall; just left of the spillway about 10 ft. from the bottom; and general leakage under the right abutment and at the interface of the laminated foliated bedrock with the laid up stone slabs. The head behind the lowest leaks was about 25 ft. All leaks are characterized by a deposit of rust-colored mold, slimy in texture, which probably originates in the microscopic aquatic biota of the impoundment. Most of these leaks have apparently also been noted in earlier inspections and, according to the State's representative, were not considered significant.

An abandoned outlet pipe through the dam also leaks persistently, as shown by the characteristic deposit of rust-colored mold (Appendix C, Photo No. 5).

Access to the crest of the dam is essentially uncontrolled, and according to the State's representative, several young people have been seriously injured by the 35 ft. fall from the top of the dam.

The spillway overflow crest is paved with a concrete veneer whose surface is quite irregular, varying as much as 2 in. from level along its length and breadth. Fillets 1 ft. high and 4 ft. long are constructed in each corner of the crest. The non-overflow abutments are about 4 ft. higher than the spillway crest, built up of earthen dikes. These are irregular in top width, have a downstream slope from the top at about 2 to 1, so that about 2 ft. of the top of the masonry dam is exposed, and have an upstream slope of about 2 to 1. The top and upstream face of the masonry dam being covered, its thickness and upstream batter could not be determined.

c. Appurtenant Structures

The outlet pipe and outlet control structure were rehabilitated and reconstructed in 1972, and appeared to be in good working order. A small discharge was being released from the outlet at the time of the inspection.

A 12 in. dia. pipe outlet emerges at the face of the dam to the right of and at about the same level as the 20 in. dia. outlet pipe. This outlet has been abandoned, but a rusty leakage was seeping from the pipe. A 1971 memo suggested that the pipe be filled with concrete. It is not known whether this recommendation was carried out.

No stilling devices or downstream protection are provided either where the outlet pipe discharges or near the toe of the dam where the spillway discharge jet would impinge. Small patches of exposed bedrock are visible below the dam, but its competency for resisting erosion from prolonged outlet and spillway flows cannot be evaluated on the basis of a visual check.

d. Reservoir Area

The shores of the reservoir are gently sloping, stable, and protected by riprap in the immediate vicinity of the dam. The hillside on the west side, from the reservoir to the top of Beseck Mountain, rises over 400 ft. in a distance of 3,000 ft. Near the crest of the mountain, there are areas where the slopes are as steep as 3 to 1. The possibility of a large landslide off the steeper slope, however, is considered unlikely as these slopes are said to have been formed by glacial "plucking" and are probably stable.

Many homes along the shore of Beseck Lake appear to be built near or below the freeboard space of the reservoir and could be affected by a rise in reservoir level owing to a large inflow.

e. Downstream Channel

State Highway 147 crosses Ellen Doyle Brook at Baileyville about 700 ft. downstream from Beseck Lake Dam. This part of the channel is partly overgrown and includes a small masonry dam and pond (Appendix B, Photo No. 4). The highway then follows along the brook for about ½ mile at a grade which is between 5 to 15 ft. above the stream bed. The roadway crossing at Baileyville is on a high embankment, under which a drop inlet culvert about 6 ft. square carries the Ellen Doyle Brook flows. It is estimated that the culvert would carry about 800 cfs. before the highway would be overtopped.

About 3,000 ft. downstream from the dam, the brook passes under a Penn Central R. R. elevated overpass, and then under the junction of State Highway 147 and 157 through a culvert, which it is estimated would carry less than 100 cfs. before overflowing. There are 7 or 8 homes situated near stream level at this junction, which would be flooded by an overflowing of the culvert. Ellen Doyle Brook then flows onto a wide, flat-lying swampy meadow to join the Coginchaug River about 2,000 ft. beyond the roadway junction. No habitations are located within the meadow area.

3.2 Evaluation

The visual inspection of the dam revealed sufficient information to permit an assessment of those features affecting the safety and stability of the structure to be made. The dam and appurtenant works are judged to be in good condition.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedures

The Connecticut Department of Environmental Protection, Region 3, Marlborough, operates the dam on an ad hoc basis. There appear to be no formal operating procedures. The pool is occasionally lowered a few feet when requested by owners of shoreline properties, in order to permit maintenance of boat docks.

4.2 Maintenance of Dam

According to officials of the Region 3 office, maintenance is carried out as needed by State forces.

4.3 Maintenance of Operating Facilities

The 24 in. dia. sluice gate which was installed in 1972 is believed to be in good condition. It was not possible to observe the stoplog installation in the outlet tower, but DEP Region 3 staff indicated that there are no problems with this facility.

4.4 Warning System

There is no formal warning system or program at this dam.

4.5 Evaluation

Operational, maintenance and emergency warning procedures should be improved and formalized.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design Data

1. Reservoir Area and Capacity

It is believed that Beseck Lake Reservoir was originally a natural lake with its outlet at about elevation 298. By construction of Beseck Lake Dam, the lake was raised by about 17 ft. The reason why the dam was not constructed at the lake outlet is not known, but presumably the site about 1,000 ft. downstream was considered more favorable, both geologically and topographically, for accommodating an "arch" dam. It is surmised that the outlet pipe through the dam was placed at the higher level, rather than at the base of the dam, so as to have it correspond to the level of the original lake outlet.

The reservoir capacity to normal storage level elevation 315 has been published as being 1,908 acre-ft. For determining surface areas and surcharge capacities above normal storage, planimetered areas were taken from contours delineated on USGS 2,000 ft. per in. quadrangle sheets. Area and capacity curves and tables, for use in flood routings, are shown on Sheets D-4 and 5, Appendix D.

2. Flood Hydrology

Hydrologic characteristics of Beseck Lake Dam and its drainage area were evaluated in accordance with criteria given in Recommended Guidelines for Safety Inspection of Dams. As indicated in Section 1.2, paragraphs c and d, Beseck Lake Dam has been accorded an intermediate size classification with a significant hazard potential rating. The recommended range of test floods for hydraulic evaluation of such a dam is between ½ PMF and PMF. The test flood considered appropriate and adopted for this review is that of ½ PMF magnitude.

Precipitation data was obtained from Hydrometeorological Report No. 33, which for the Connecticut area approximates 24.3 in. of 6-hour point rainfall over a 10 square mile area. This value is then reduced by 20 percent to

allow for basin size, shape and fit factors. The 6 hour rainfall was distributed into one hour incremental periods as suggested in COE Publication EC 1110-2-1411. A constant loss of 0.1 in. per hour was deducted from the precipitation values to give excess rainfall used to prepare an inflow hydrograph.

For preparation of the inflow hydrograph, a triangular incremental unitgraph was assumed, using a computed lag time value of about 1.25 hours to derive a time-to-peak for the triangular hydrograph of 1.5 hours (see Sheets D-6 and D-7, Appendix D). A PMF inflow hydrograph is shown on Fig. 3, Sheet D-8, Appendix D.

Routing the 0.5 PMF inflow hydrograph flood through the reservoir and spillway results in a maximum surcharge to elevation 318.75, or to a level slightly below the top of the dam. A graphic flood routing through the reservoir and spillway for the 0.5 PMF is shown on Fig. 4, Sheet D-9, Appendix D.

b. Experience Data

No records are available in regard to past operation of the reservoir or of surcharge encroachments and outflows through the spillway or outlet. The maximum past inflows are unknown.

c. Visual Observations

At the time of the inspection, no evidence could be found, either along the reservoir or in the downstream channel, to indicate high water levels or signs of overtopping of the dam.

d. Overtopping Potential

For the 0.5 PMF test flood, the surcharge storage level in the reservoir would rise to about 318.75. This is just below the level of the earth dike at the right abutment. The test flood would not, therefore, overtop the dam. The spillway discharge for this inflow would be about 2,150 cfs.

e. Drawdown Capacity

Drawdown of the reservoir to the assumed level of the original lake is possible through the 20-in. dia. outlet pipe at about elevation 298. If it is deemed necessary to evacuate the reservoir through this outlet, it is estimated that over 27 days would be required to empty the 1,900 acre-ft. of storage, assuming no inflow into the reservoir in the interim (see Sheet D-10, Appendix D).

f. Downstream Hazard Potential

As noted in Para. d., for a 0.5 PMF test flood the dam would not be overtopped. Under this condition a spillway flow of about 2,150 cfs would be released down the brook. If a breach owing to a structural failure of the dam was to occur, a breach similar to that from an overtopping could be assumed and the "rule of thumb" criteria suggested in the NED March 1978 guidance report would be applicable. In this instance the reservoir could be assumed to be at normal storage level rather than to the top of the dam. If the failure criteria suggested in the NED report were followed, an outflow of about 18,000 cfs. would be realized (see Appendix D, Sheet D-10).

A stage discharge curve for the average cross section and slope on the Ellen Doyle Brook was computed, showing a stage of about 10 ft. for an 18,000 cfs. flow. Flow at this stage would overtop the Highway 147 crossing over the stream 700 ft. below the dam and partly inundate some of the homes in that vicinity. A portion of Highway 147 upstream from the railroad overpass would also be submerged, engulfing some of the homes below the railroad overpass. Beyond this point the flow would enter the broad, low lying valley of the Coginchaug River.

Downstream from the confluence with Ellen Doyle Brook, the Coginchaug River flows along a flat slope to a control at Wadsworth Falls. The Penn-Central R.R. crosses the river valley about ½ mile below the confluence on a high embankment, with a 100 ft. bridge spanning the river waterway. This 100 ft. wide waterway would form a control for high river flows and cause a backwater into the valley upstream. The riverbed level at the waterway underpass is estimated to be somewhat higher than elevation 140, perhaps at elevation 142. Assuming an 8 ft. gradient height at the bridge, critical flow would indicate a discharge of about 7,000 cfs. through the 100 ft. wide gap (see Sheet D-11). The surface area of the pond upstream which would be formed in the low lying meadow and marsh is about 735 acres. Since no contours are shown in this valley on the quadrangle sheet below elevation 150, the surface area downstream can only be estimated. Assuming an average area of about 400 acres, a depth of about 5 ft. would store the entire volume which could be released from the reservoir. The outflow down

river for this depth would be about 3,000 cfs. Except for several highway crossings and a small millpond, there do not appear to be any major installations on the Coginchaug River between Wadsworth Falls and the Connecticut River which would be damaged by this magnitude of flow. Delineated on Figure 5, Sheet D-12 (quad sheet graphic) is the approximate area which could be flooded by a breach failure of the dam.

SECTION 6 - STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

The field investigations of the embankment revealed no significant displacement or distress which would warrant the preparation of stability computations based on assumed soil properties and engineering factors.

From visible evidence, it is conjectured that the ashlar masonry dam was originally constructed as a self-supporting arch structure, without the present earth embankment topping along the non-overflow sections and without the upstream embankment fill. The non-overflow abutments may have been constructed originally to about elevation 316, with only a 1 ft. difference between spillway and abutment levels. It can further be conjectured that the upstream fill was added to act as a seal for that leakage which developed through the masonry dam, and it was also decided to provide added freeboard by raising the top of the embankment to elevation 319.

If this hypothesis is correct, where the upstream fill was added, the upstream loading was changed from a hydrostatic pressure of 62.5 lbs. per cu. ft. to an equivalent hydrostatic loading for saturated fill at about 85 to 90 lbs. per cu. ft., with additional loadings owing to surcharge because of the higher level fill. Nevertheless, the dam appears to have remained in a stable condition.

b. Design and Construction Data

The original dam is said to have been built in 1846, but no data is available on the design or construction. It is not known when the State of Connecticut acquired the dam, but the previous owner is reported to have been Middlefield Reservoir Company.

The dam was repaired and a new outlet structure was constructed in 1972. In April of that year, the State's Superintendent of Dam Maintenance inspected the work and judged the dam to be in a safe condition (Appendix B). It was then recommended that a lock be placed on the access gate to prevent trespassing.

Drawings of these repairs, to reduced scale, are included in Appendix B.

c. Operating Records

No formal records are known to exist. It is understood that the lake is usually drawn down in the autumn to allow repairs to floats and piers.

d. Post Construction Changes

The repairs of 1971-72 are the only major post construction changes known, and do not adversely affect stability.

e. Seismic Stability

The dam is located in Seismic Zone No. 1, and in accordance with Phase I guidelines does not warrant seismic analysis.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS & REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition

On the basis of the Phase I visual examination, the dam appears to be in good condition and functioning adequately. The deficiencies revealed do not appear to be of major concern. There was no visible evidence of instability or distress, and seepage through and under the dam appeared to be minor. The spillway capacity is adequate to pass the test flood outflow without an overtopping of the non-overflow sections of the dam. There is no impact pad at the toe of the dam for resisting scouring action from the free-falling spillway jet, but erosion below the dam appears to be negligible. The outlet pipe is not adequate for evacuating the reservoir in the event that a rapid withdrawal becomes necessary.

b. Adequacy of Information

Since no engineering data or records for the dam structure have been recovered, the information available must be considered inadequate. Assessment of the performance of the dam has, therefore, been based solely on visual observations and engineering judgment.

c. Urgency

The dam appears to be in no immediate danger of becoming a hazard to life and property. The recommendations and remedial measures enumerated below should be implemented by the owner within two years after receipt of this Phase I Inspection Report.

d. Need for Additional Investigation

Additional investigations are required as recommended in Para. 7.2.

7.2 Recommendations

It is recommended that the owner of Beseck Lake Dam should retain the services of a competent registered professional engineer to make investigations and studies of the following items, and, if proved necessary, design appropriate remedial works.

1. Structural Stability

   An investigation should be made to determine whether the ashlar masonry wall is a complete, free-standing arch dam, or whether it is part of some other type of structure, and to ascertain exact foundation conditions. When the type of structure has been determined, a structural stability analysis should be performed to determine whether strengthening the dam would be advisable.

2. Downstream Scour

   An investigation should be made of the need to forestall future erosion of a scour pool, with possible undermining of the dam, by provision of a high-flip bucket or a concrete impact pad at the toe of the spillway section of the dam.

3. Drawdown Capability

   A determination should be made as to whether the existing outlet facilities are of adequate size.

4. Leakage

   Studies are needed to determine how serious the leakage is and to assess the feasibility of grouting or other methods for sealing the leaks.

5. Landslide Potential

   The stability of the very steep slopes on the west side of the reservoir should be investigated.

7.3 Remedial Measures

The owner should take the following actions:

1. Eliminate and control growth on the crest of the dam, on the face of the downstream wall and in the downstream channel.

2. Monitor on a monthly basis all leaks through the downstream face, for changes in volume and turbidity.

3. Level the irregular tops of the two abutment dikes.

4. Repair riprap on the upstream face of the dam in the vicinity of the walkway to the outlet tower.

a. Operation and Maintenance Procedures

The owner should institute procedures for a biennial periodic technical inspection of the dam and appurtenant works, with supplementary inspections for any suspect items. A checklist for periodic inspections should be developed and records should be kept of all maintenance and repair work performed. Ordinary maintenance, such as cutting brush and repairing riprap, should be carried out in accordance with a regular and consistent program. A formal surveillance, flood warning and emergency evacuation plan should also be developed.

7.4 Alternatives

The only appropriate alternative to these recommendations appears to be to maintain the reservoir at a lower pool elevation.

APPENDIX A

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION
PHASE I

Identification No. CT 00381 Name of Dam: Beseck Lake Dam

Date of Inspection: 8 November 1978

Weather: Cloudy Temperature: 50°F ±

Pool Elevation at Time of Inspection: 311 MSL

Tailwater Elevation at Time of Inspection: Not applicable

INSPECTION PERSONNEL

Pasquale E. Corsetti	Louis Berger & Associates, Inc.	Acting Proj. Manager
Carl J. Hoffman	Louis Berger & Associates, Inc.	Hydraulics, Structures
Thomas C. Chapter	Louis Berger & Associates, Inc.	Hydrology, Soil
James H. Reynolds	Goldberg Zoino Dunnicliff & Assoc., Inc.	Soils

OWNER'S REPRESENTATIVE

Donald Barry	Connecticut Department of Environmental Protection, Region III Headquarters	Unit Manager

VISUAL INSPECTION CHECKLIST

Identification No. CT 00381	Name of Dam: Beseck Lake Dam	Sheet 1
VISUAL EXAMINATION OF	OBSERVATIONS AND REMARKS	
EMBANKMENT Vertical alignment and movement	No movement evident.	
Horizontal alignment and movement	No movement evident. Tops of earthen dikes on abutments are irregular.	
Unusual movement or cracking at or near the toe	None.	
Surface cracks	None evident, but ashlar masonry d/s face wet, some seepage areas.	
Animal burrows and tree growth	No burrows evident. Brush growth on crest and in d/s channel. Vegetation on d/s masonry face.	
Sloughing or erosion of slopes	Erosion left of spillway, near catwalk to outlet tower, on upstream slope.	
Riprap slope protection	Satisfactory generally, absent from eroded area near catwalk, as above.	

VISUAL INSPECTION CHECKLIST

Identification No. CT 00381 | Name of Dam: Beseck Lake Dam | Sheet 2

VISUAL EXAMINATION OF	OBSERVATIONS AND REMARKS
Seepage	Leaks at: left abutment area; beneath spillway, halfway up face; at interface of foundation (bedrock?) with downstream wall; through abandoned 12 in. dia. pipe outlet.
Piping or boils	None.
Junction of embankment and abutment, spillway and dam	Masonry d/s face presumed to be tied into bedrock. No problems evident.
Foundation drainage	None.
OUTLET WORKS Approach channel	None.
Outlet conduit concrete surfaces	N/A
Intake structure	20 in. dia. RCP (not visible).
Outlet structure	20 in. internal dia. concrete lined steel pipe projecting 1 ft. through masonry d/s face of dam.

VISUAL INSPECTION CHECKLIST

Identification No. CT 00381 | Name of Dam: Beseck Lake Dam | Sheet 3

VISUAL EXAMINATION OF	OBSERVATIONS AND REMARKS
Outlet channel	Natural stream (same as spillway discharge channel).
Drawdown facilities	24 in. dia. sluice gate in tower.
SPILLWAY STRUCTURES Concrete weir	Broad crested overflow over center portion of dam crest; free-fall jet into discharge channel.
Approach channel	None.
Discharge channel	Natural stream, some rock outcrops.
Stilling basin	None.
Bridge and piers	None.
Control gates and operating machinery	None.

VISUAL INSPECTION CHECKLIST

Identification No. CT 00381 | Name of Dam: Beseck Lake Dam | Sheet 4

VISUAL EXAMINATION OF	OBSERVATIONS AND REMARKS
INSTRUMENTATION Headwater and tailwater gages	None.
Embankment instrumentation	None.
Other instrumentation	None.
RESERVOIR Shoreline	Gentle slopes, wooded, many homes close to shore and on Beseck Mountain. West part of drainage area very steep.
Sedimentation	None evident.
Upstream hazard areas in event of backflooding	Many shoreline homes are within surcharge storage of dam.
Alterations to watershed affecting runoff	No recent alterations evident.

VISUAL INSPECTION CHECKLIST

Identification No. CT 00381 | Name of Dam: Beseck Lake Dam | Sheet 5

VISUAL EXAMINATION OF	OBSERVATIONS AND REMARKS
DOWNSTREAM CHANNEL Constraints on operation of dam	None.
Valley section	Rather confined and narrow.
Slopes	Steep.
Approx. No. of homes/population	At least 15 homes and some commercial establishments in 1.5 miles d/s to main river.
OPERATION & MAINTENANCE FEATURES Reservoir regulation plan, normal conditions	No formal plan. Lake level lowered at request of shoreline owners to permit dock maintenance.
Reservoir regulation plan, emergency conditions	No formal plan.
Maintenance features	Periodic, as needed and/or labor available.

VISUAL INSPECTION CHECKLIST

Identification No. CT 00381 | Name of Dam: Beseck Lake Dam | Sheet 6

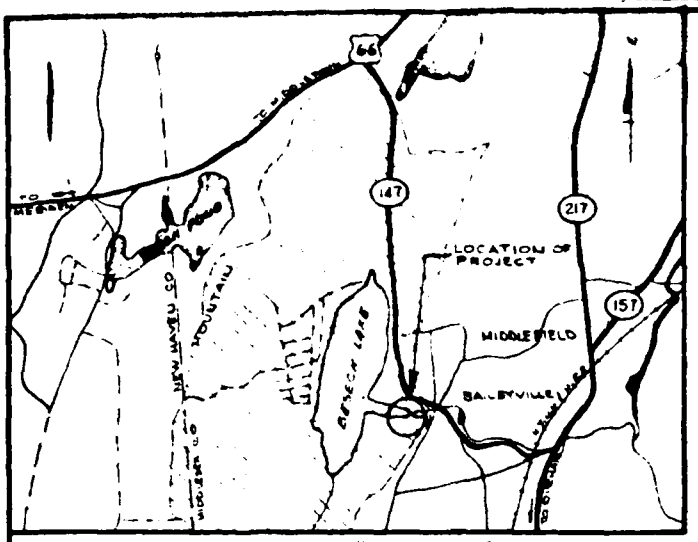
VISUAL EXAMINATION OF	OBSERVATIONS AND REMARKS
MASONRY DAM Seepage or leakage	Leaks at: left abutment area; beneath spillway, half way up face; at interface with foundation; through abandoned 12 in. dia. pipe outlet through dam.
Structure to abutment/embankment junctions	Masonry "arch" assumed tied into bedrock.
Drains	None.
Water passages	See "Outlet Works", Sheet 2.
Foundation	Presumed founded on bedrock (patches visible at toe and downstream).
Surface cracks, concrete surfaces	N/A
Structural cracking	None evident (ashlar masonry joints obscure possible cracks).

VISUAL INSPECTION CHECKLIST

Identification No. CT 00381	Name of Dam: Beseck Lake Dam	Sheet 7
VISUAL EXAMINATION OF	OBSERVATIONS AND REMARKS	
Vertical and horizontal alignment	Appear good.	
Monolith joints	N/A	
Construction joints	N/A	

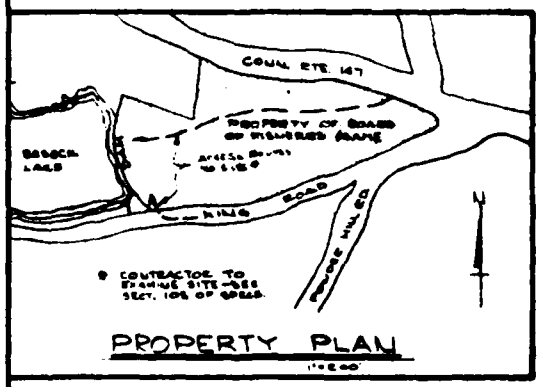
APPENDIX B

PLANS, RECORDS & PAST INSPECTION REPORTS

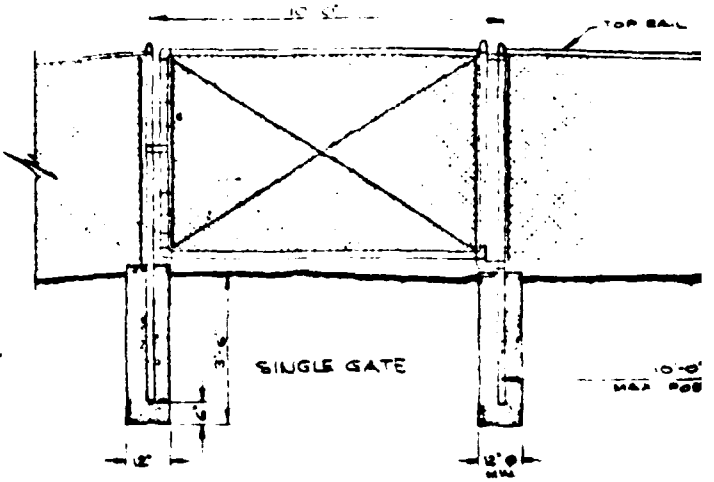


LOCATION PLAN

WATERSHED AREA = 1350 ACRES
LAKE AREA = 114 ACRES

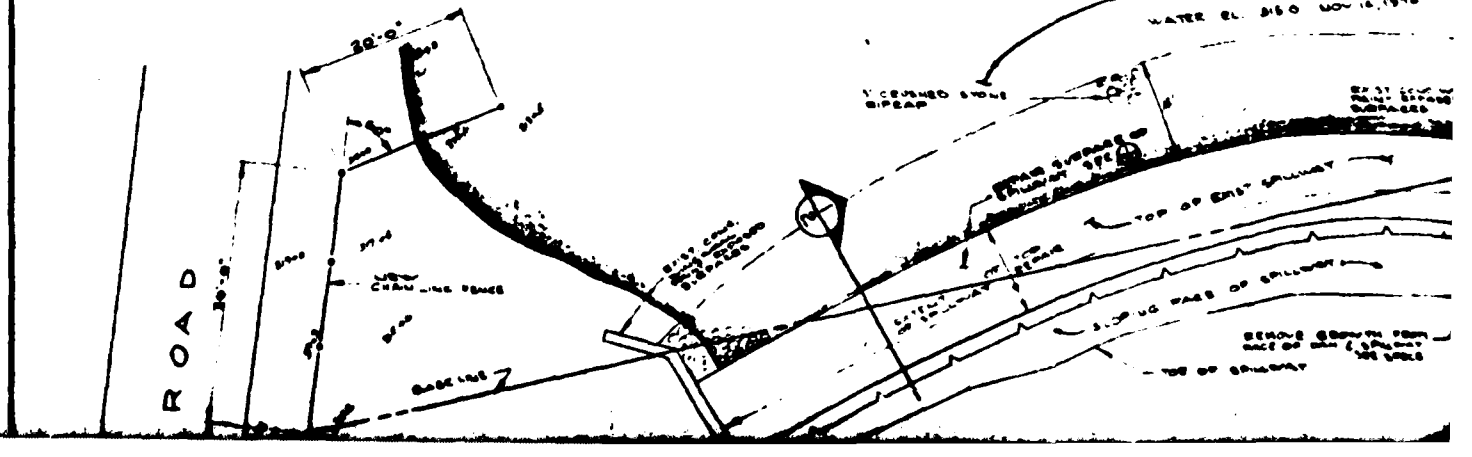


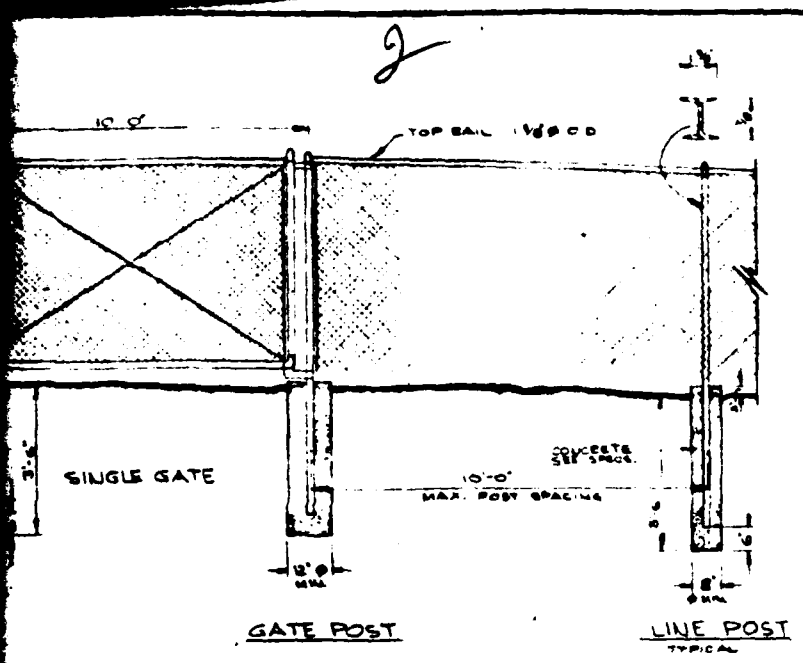
PROPERTY PLAN



GATE POST

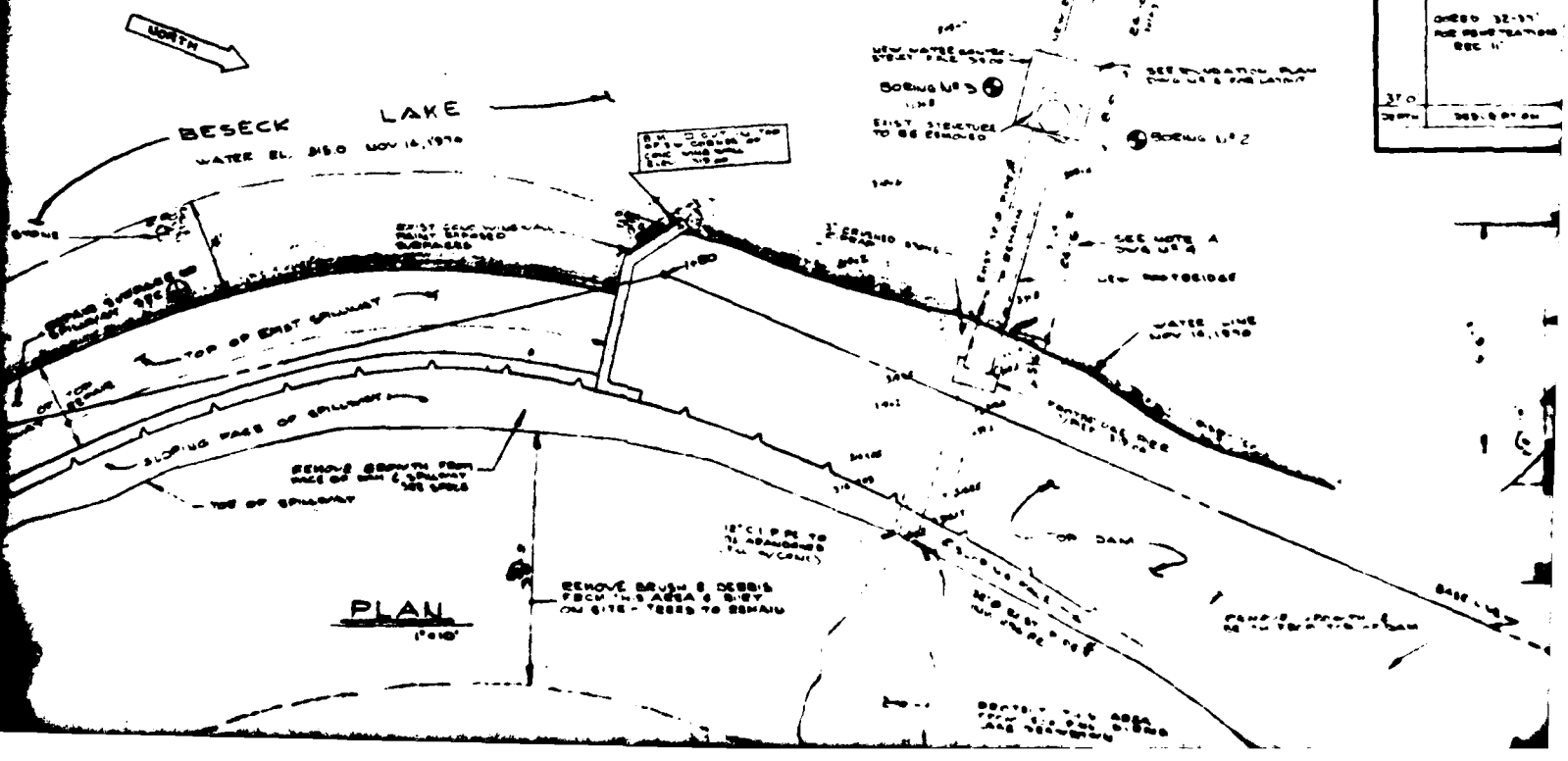
PARTIAL ELEVATION - CHAIN L

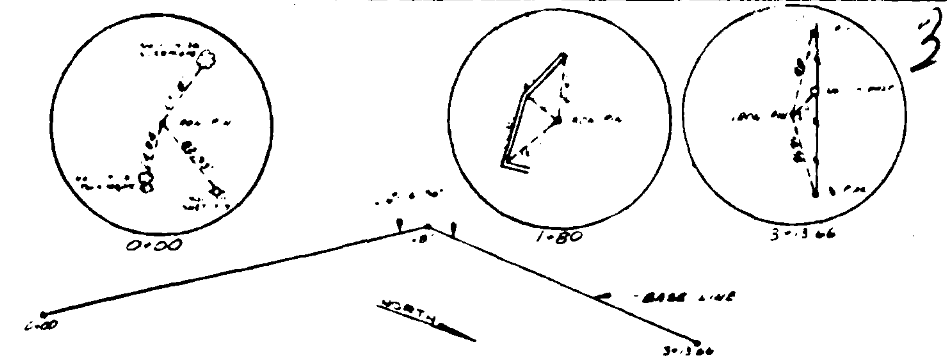




PARTIAL ELEVATION - CHAIN LINK FENCE

1/2"=1'-0"





BASE LINE DETALS

NOTES

1. Borings taken by Clarence ... Nov. ... 1970

2. ... Data ... ... Andres U.S. ... 1970

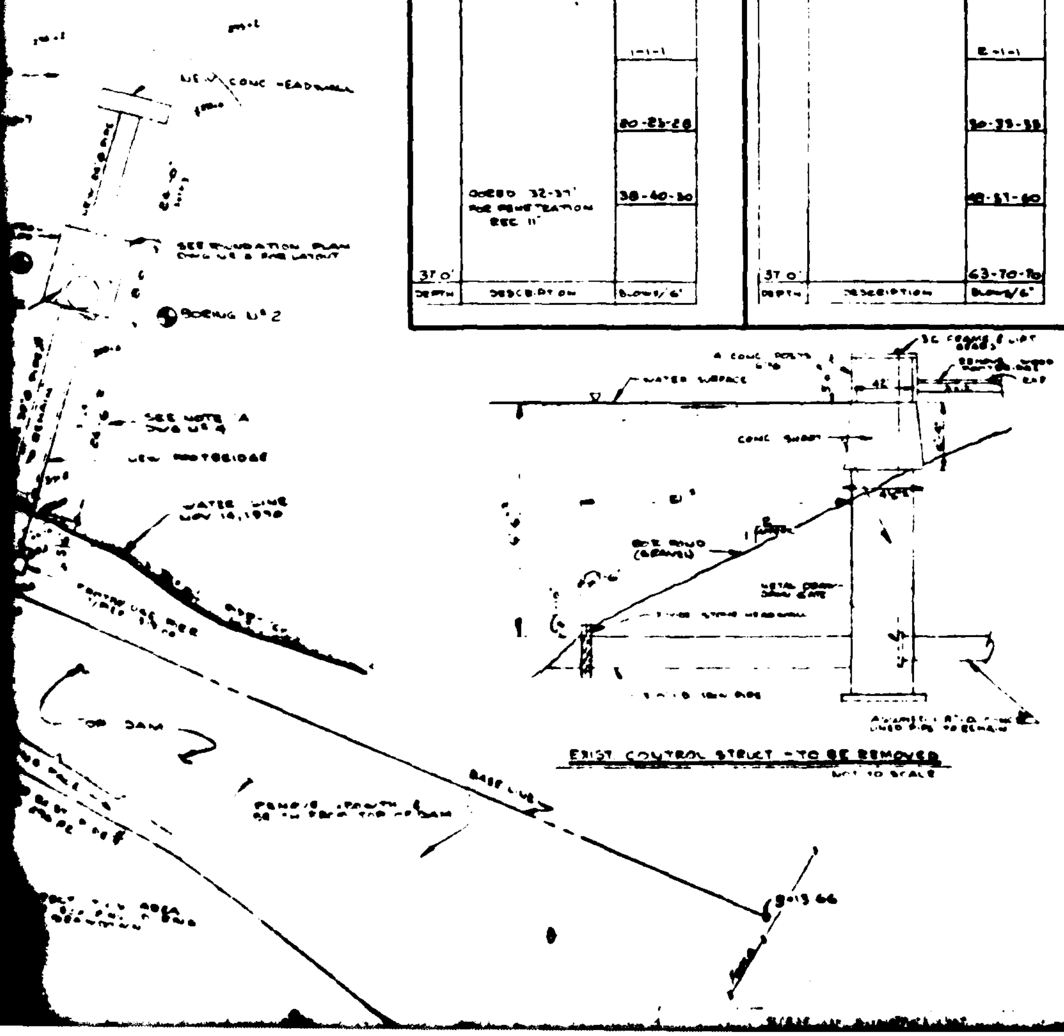
3. ...

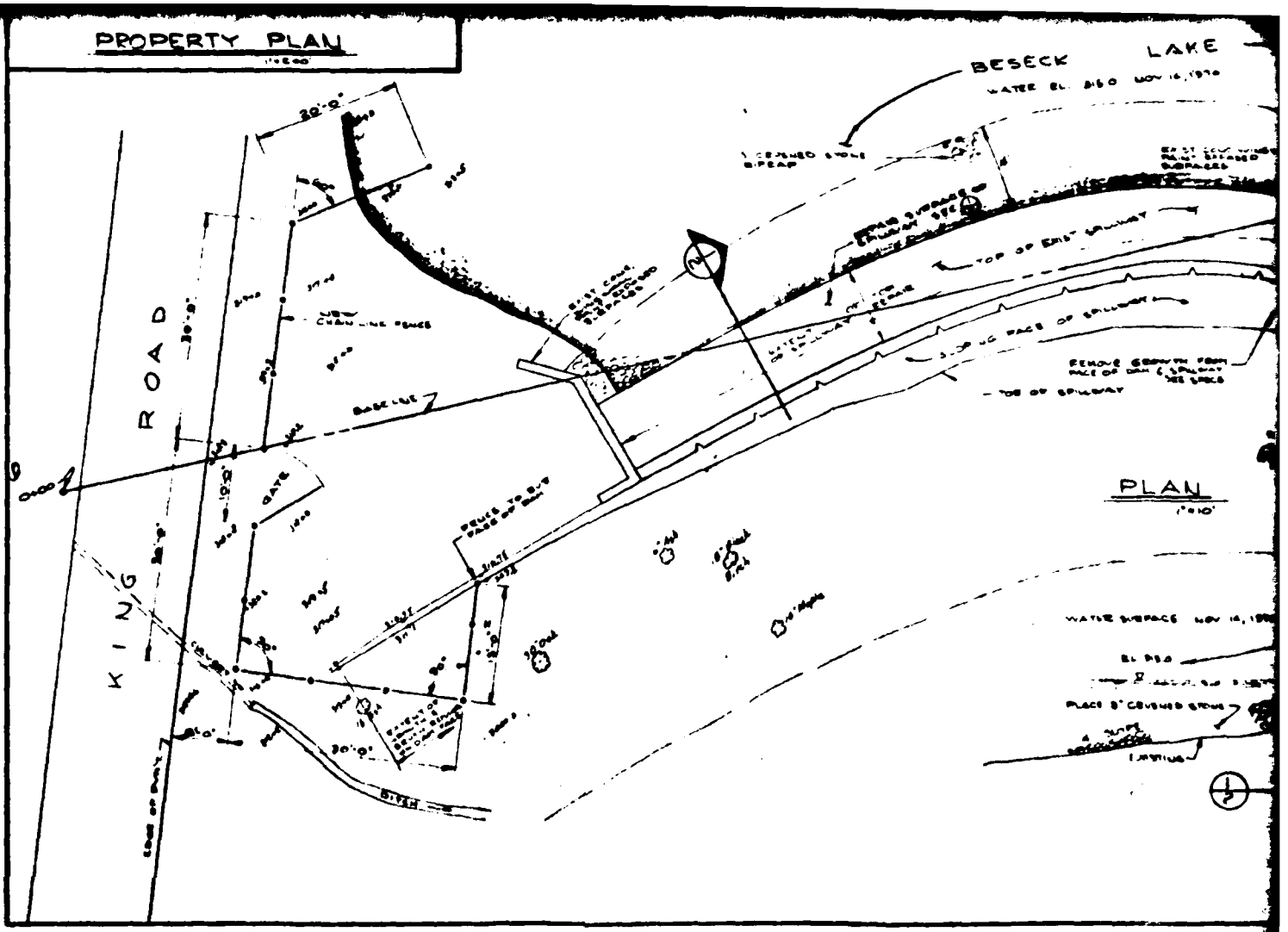
BORING Nº 2

DEPTH	DESCRIPTION	BLOWS/6"
3.5.00	WATER	
7.0'		6-3-3
	RED/BR FINE-MED. SAND, SOME FINE-MED GRAVEL (TR. WOOD)	2-2-
		1-1-1
		1-1-1
		20-25-28
	CORED 32-37' FOR PENETRATION REC 11"	38-40-30
37.0'		

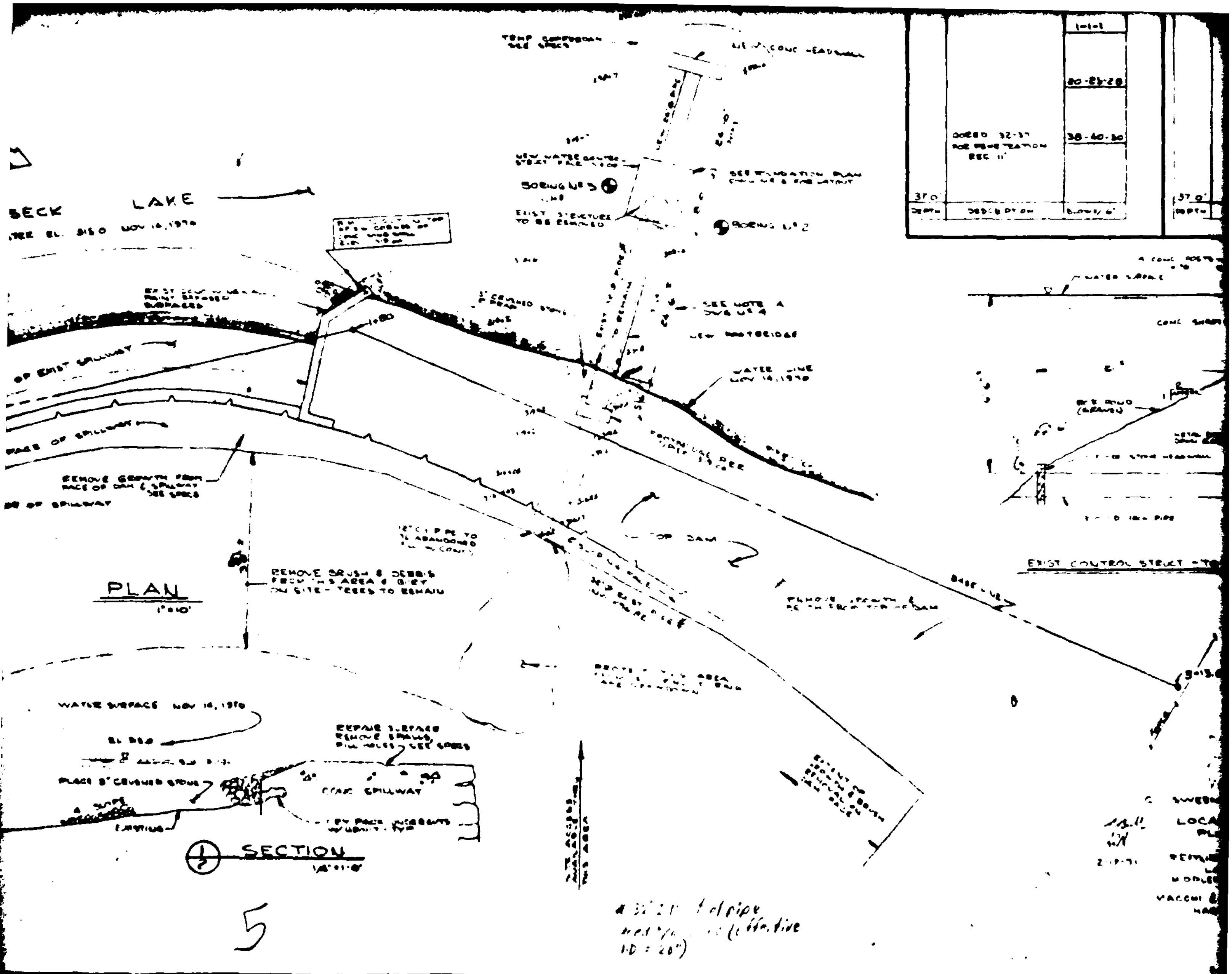
BORING Nº 3

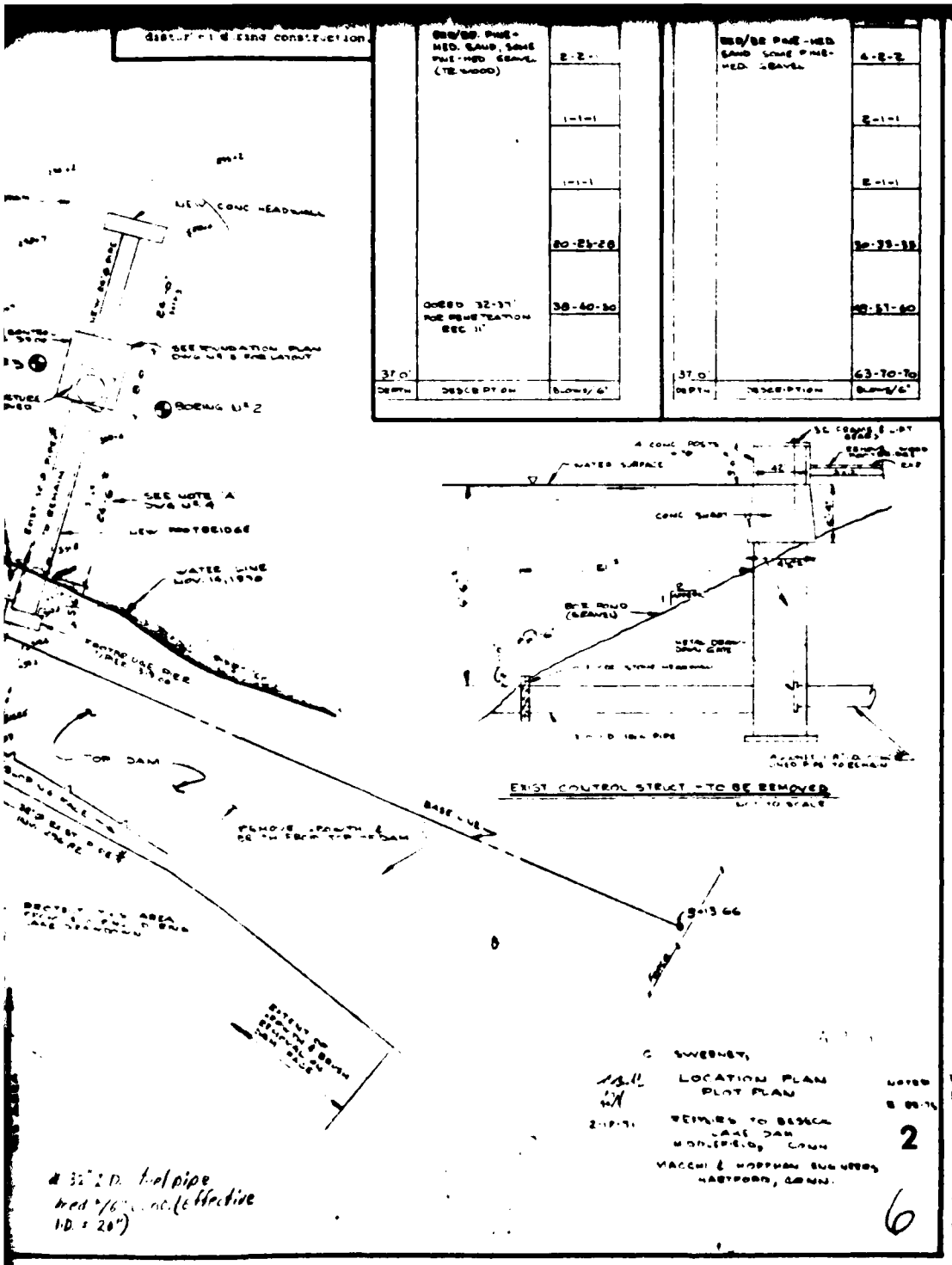
DEPTH	DESCRIPTION	BLOWS/6"
3.5.00	WATER	
7.0'		7-6-2
	RED/BR FINE-MED SAND SOME FINE-MED. GRAVEL	4-2-2
		2-1-1
		2-1-1
		30-35-35
		48-57-60
37.0'		63-70-70



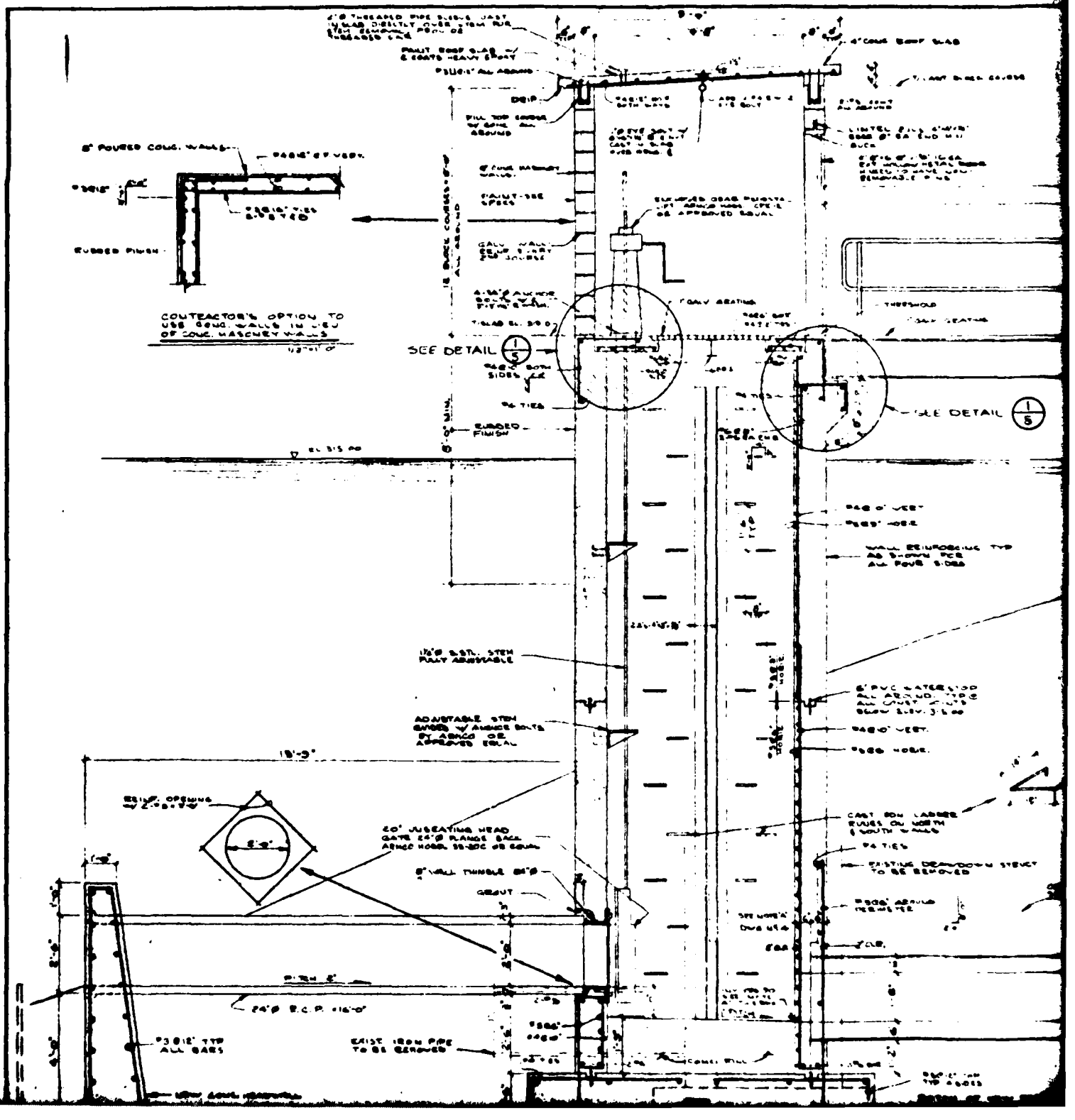


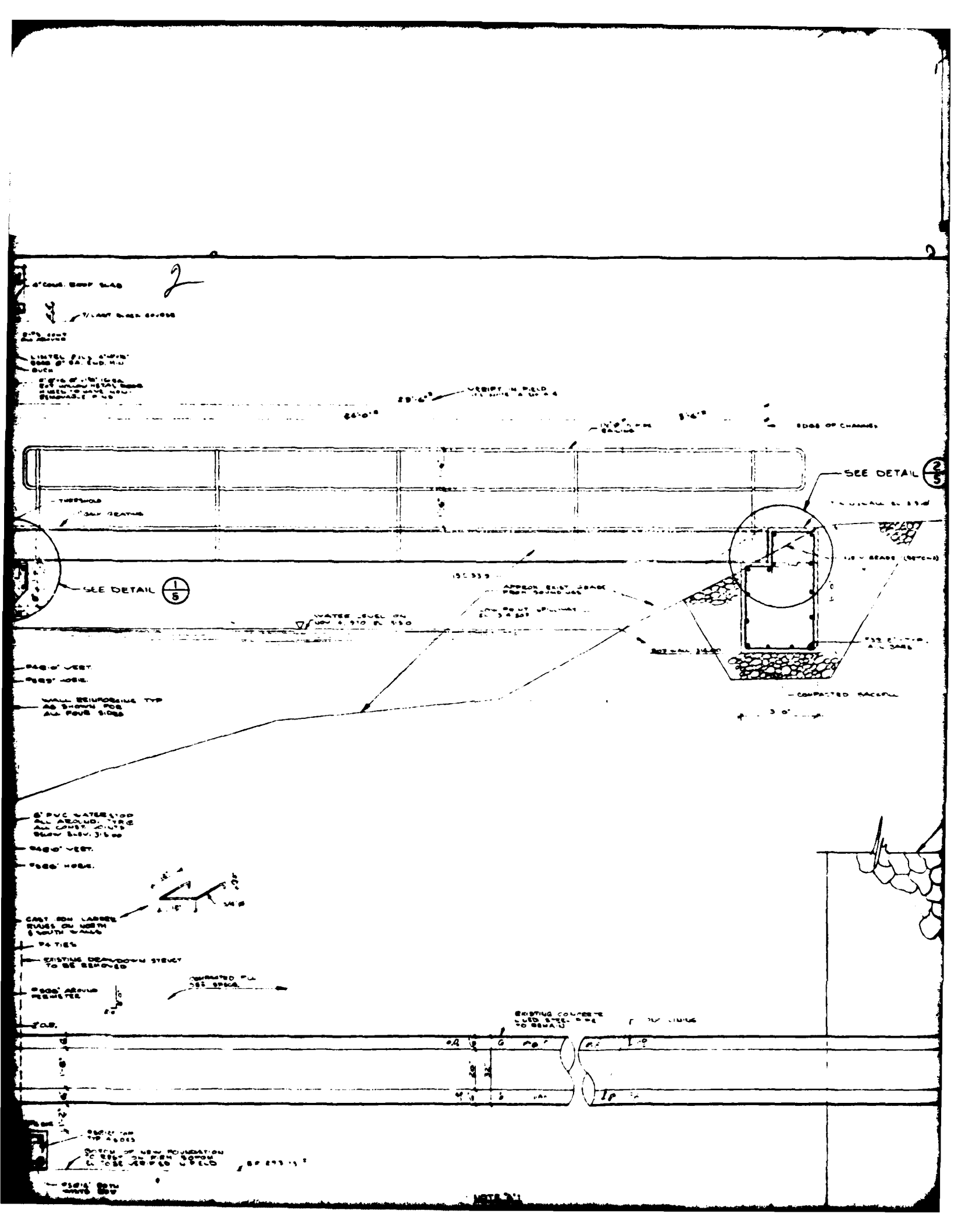
4

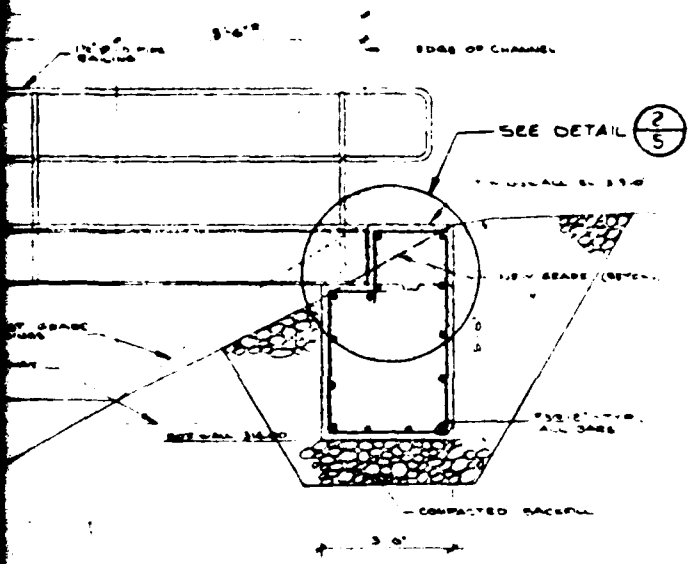

LAKE
PLAN
SECTION
WATER SURFACE NOV 14, 1970
PLACE 3" CRUSHED STONE
CONC SPILLWAY
REMOVE BRUSH & DEBRIS
REMOVE GROWTH FROM FACE OF DAM & SPILLWAY SEE SPECS
TOP DAM
BORING NO 3
BORING NO 2
EXIST STRUCTURE TO BE REMOVED
SEE NOTE A DWG NO 4
NEW FOOTBRIDGE
WATER LINE NOV 14, 1970
EXIST CONTROL STRUCT
REPAIR SURFACE REMOVE SPALLS,
5

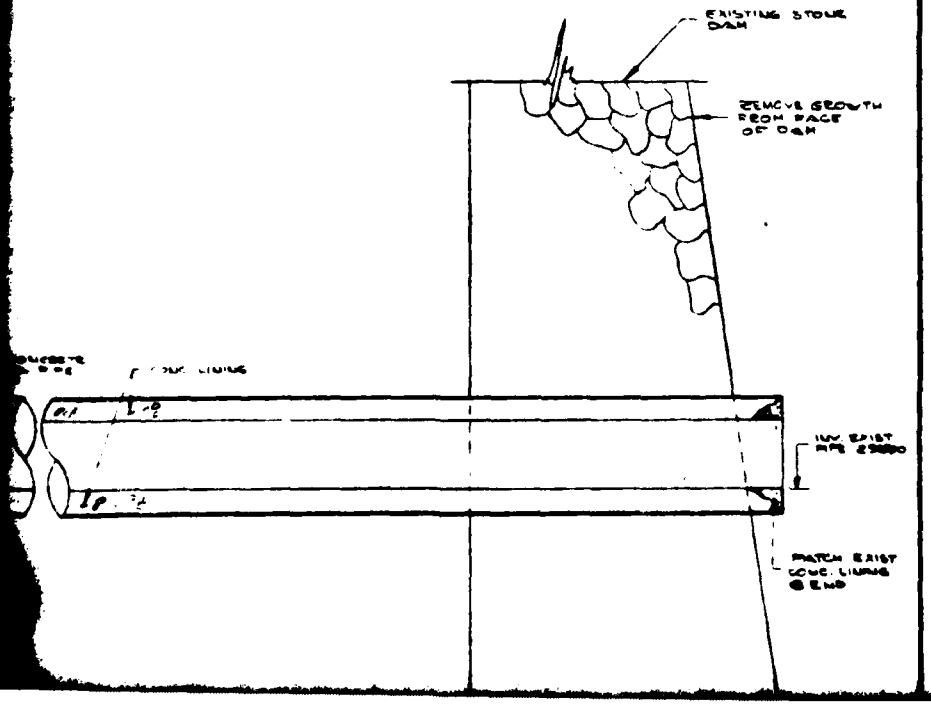


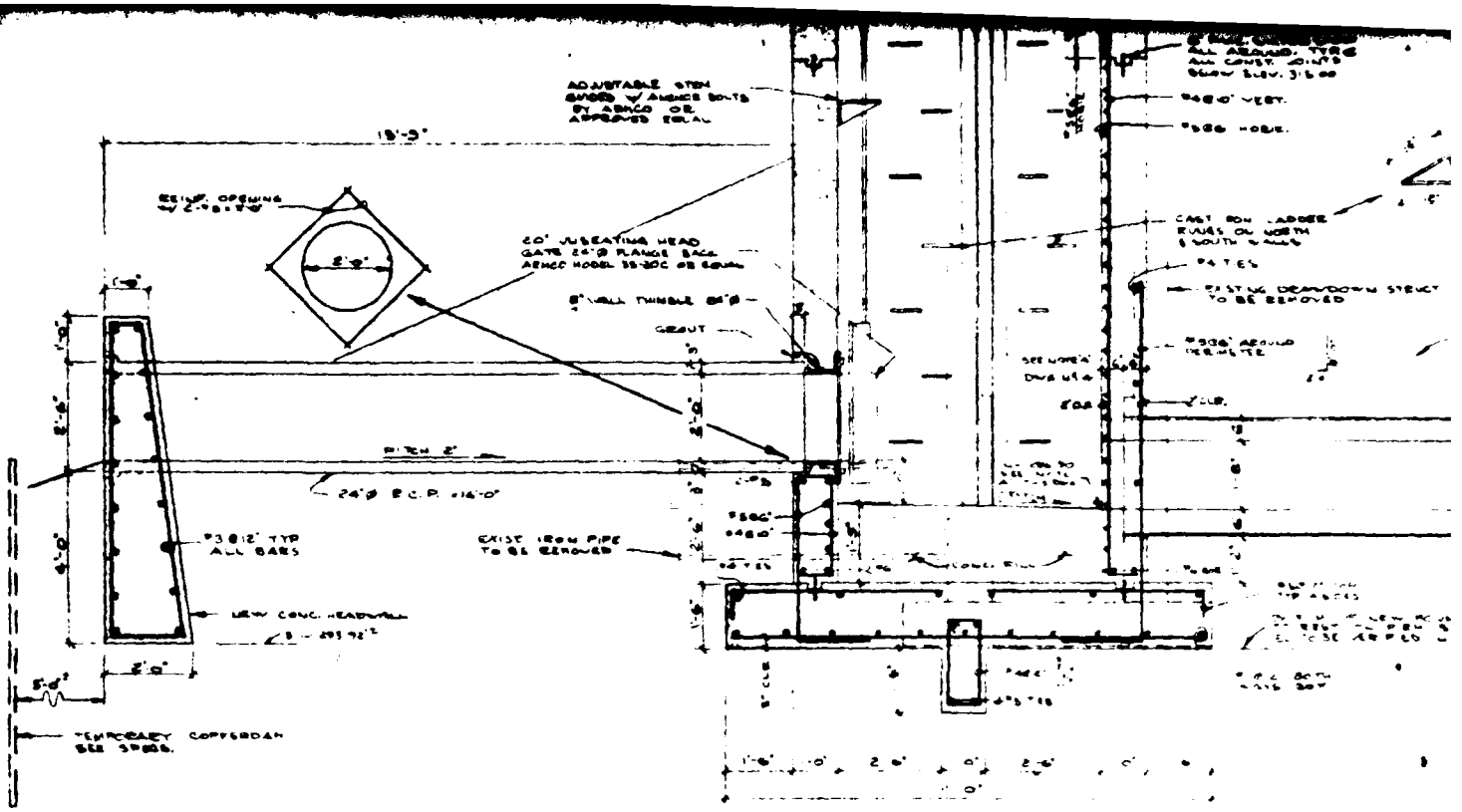
32" D. tailpipe
head 5/6" conc. (effective
I.D. = 26")


CONTRACTOR'S OPTION TO USE CONC. WALLS IN LIEU OF CONC. MASONRY WALLS
SEE DETAIL 1/5
SEE DETAIL 1/5
RUBBED FINISH
CAST IRON LADDER RUNGS ON NORTH & SOUTH WALLS
EXISTING DRAWDOWN STRUCT TO BE REMOVED
EXIST IRON PIPE TO BE REMOVED
GROUT
24"Ø R.C.P.


2
SEE DETAIL 1/5
SEE DETAIL 2/5
EDGE OF CHANNEL
WATER LEVEL ON
COMPACTED BACKFILL
WALL REINFORCING TYP
AS SHOWN FOR
ALL FOUR SIDES
CAST IRON LADDER
RUNGS ON NORTH
& SOUTH WALLS
EXISTING DRAINDOWN STRUCT
TO BE REMOVED
EXISTING CONCRETE
LINED STEEL PIPE
TO REMAIN


EDGE OF CHANNEL
SEE DETAIL (2/5)
COMPACTED BACKFILL
3'-0"


EXISTING STONE DAM
REMOVE GROWTH FROM FACE OF DAM
INV. EXIST. PIPE
PATCH EXIST. CONC. LINING @ END


ADJUSTABLE STEM
GUIDES W/ ANCHOR BOLTS
BY ARMCO OR
APPROVED EQUAL
18'-3"
DESIGN OPENING
W/ 2'-0" x 2'-0"
20" SUBSEATING HEAD
GATE 24"Ø FLANGE BACK
ARMCO MODEL 55-30C OR EQUAL
6" WALL THIMBLE 24"Ø
GROUT
PITCH 2"
24"Ø R.C.P. =16'-0"
#3 @ 12" TYP
ALL BARS
NEW CONC. HEADWALL
EXIST. IRON PIPE
TO BE REMOVED
TEMPORARY COFFERDAM
SEE SPEC.
CAST IRON LADDER
RUNG ON NORTH
& SOUTH WALLS
PATES
EXISTING DRAWDOWN STRUCT
TO BE REMOVED
SEE WORK
DWG #16
EXIST.
TYP. ALL SIDES
LONGIT. DINA

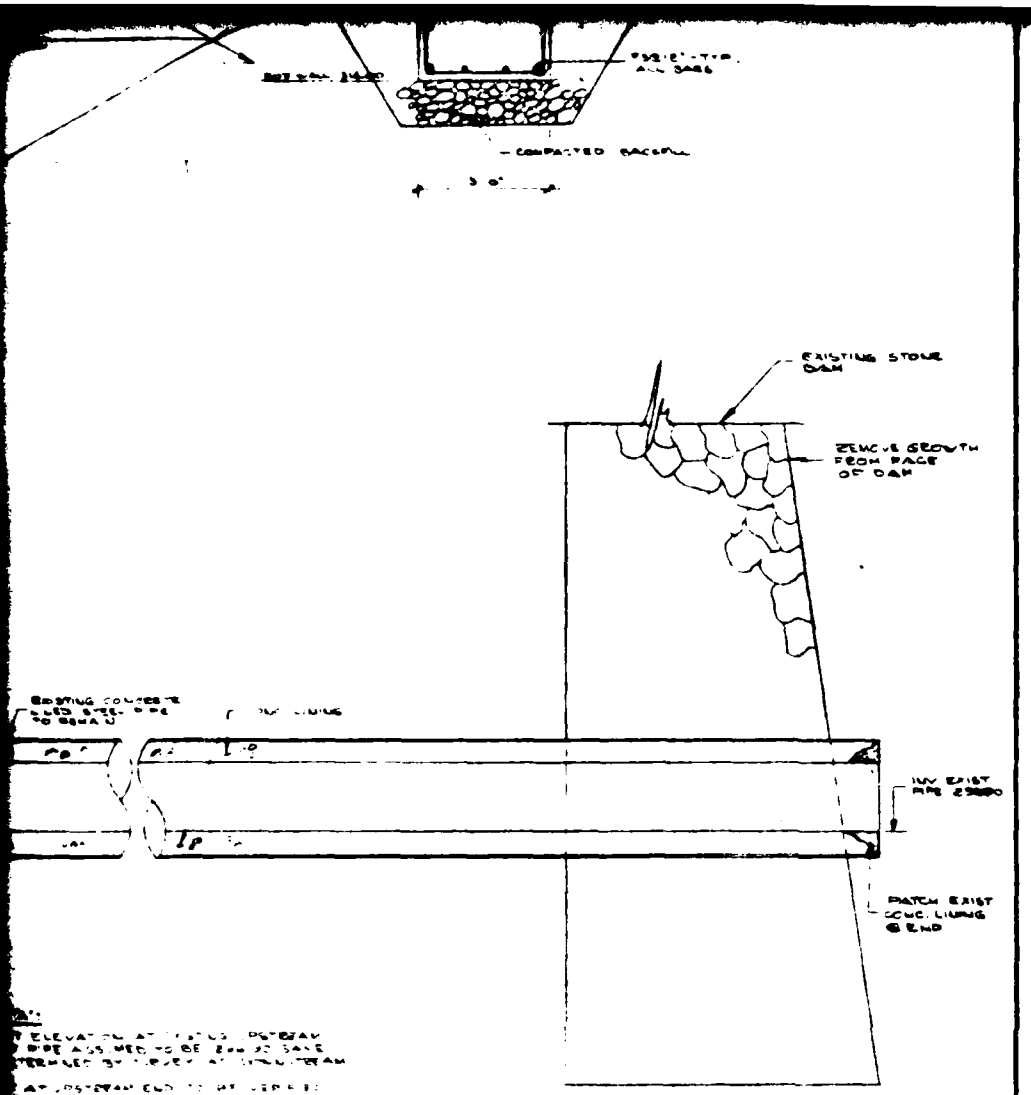
1/3

4

GITUDINAL SECTION

PUBLIC

5



PUBLIC WORKS DEPARTMENT

LONGITUDINAL SECTION

REPAIRS TO BEAVER LAKE DAM MODIFIED

3

6

SPECIFICATIONS

FOR

REPAIRS TO
BESECK LAKE DAM
MIDDLEFIELD, CONNECTICUT
PROJECT BI-BB-75

MACCHI & HOFFMAN, ENGINEERS
44 GILLETT STREET
HARTFORD, CONNECTICUT

JANUARY 1971

CHANDLER & PALMER
CIVIL ENGINEERS
114-116 THAYER BUILDING
TELEPHONE TURNER 7-5640

BENJAMIN H. PALMER
SHEPARD B. PALMER

MEMBERS AMERICAN AND CONNECTICUT SOCIETIES
OF CIVIL ENGINEERS

DAMS
WATER SUPPLI
SEWERAGE
APPRAISALS
REPORTS
SURVEYS

NORWICH, CONN.

November 12, 1957

Re: Beseck Lake

Water Resources Commission
State Office Building
Hartford, Connecticut

Attention: Mr. Merwin E. Hupfer

Dear Sir:-

Beseck Lake is located near Route #147 in the Town of Middlefield about halfway between Middletown and Meriden. This lake is of good size with many small cottages around it. It has a water shed of about three square miles.

The dam itself is an earth dam about 300 feet long and a maximum height of about 35 feet. It is faced downstream with a good stone masonry wall laid in a horizontal arch.

The spillway is a concrete apron 100 feet long and a maximum height of 4 feet to top of abutments. There is one draw down gate with a 30" iron pipe through the dam. This pipe is lined with concrete, so that there is a clear opening of 20" in diameter.

There was a small amount of leakage through the gate and a very little amount through the dam but nothing to be concerned about.

It appears to me that the dam, spillway and gate are in good condition. The spillway is ample for the drainage area according to our present thinking.

I consider this dam in good condition and believe no repairs to it will be necessary for the next 10 or 15 years.

Very truly yours,

B H Palmer

BHP/ew

The following articles are supplementary to the General Conditions.

1.01 GENERAL

a) This project is located at Beseck Lake on Route 147 in Middlefield, Connecticut.

1.02 SCOPE

This contract includes all labor and materials to complete the work shown on the plans and described in these specifications including, but not necessarily limited to the following:

1. Clearing and grubbing
2. Removal of existing drawdown structure and pipe
3. Excavation and backfilling
4. Construction of new water control structure
5. Construction of new footbridge and foundation
6. Construction of new headwall
7. Providing new intake pipe.
8. Providing new chain link fence
9. Spillway repair

1.03 LAYOUT OF THE WORK

a) The General Contractor shall employ a registered Land Surveyor to accurately establish dimensions and elevations of all work and to verify same as the work progresses. Any deviations from the dimensions or elevations shown on the drawings shall be made known to the Engineer who shall approve final dimensions and elevations. See also Article 18 of General Conditions.

2.01 WORK INCLUDED

a) This section includes all labor, tools and materials to complete all work as defined on the drawings and hereinafter specified. The following shall be taken as a general outline and not a complete or specific list. It shall be considered as being supplemented by subsequent Specifications and Contract Drawings.

1. Clearing and grubbing
2. Pond drawdown
3. Removal of existing structure and pipe
4. Earthwork
5. Spillway repair
6. Existing pipe repair
7. Removal of growth from face of dam
8. Placement of new rip rap
9. Erection of new chain line fence
10. Grassed areas

2.02 CLEARING AND GRUBBING

a) Within the limits shown on drawings remove brush and debris from toe of dam. Trees as noted on plans are to be saved. The Contractor shall erect barriers or take other measures necessary to preserve these trees. All other trees and brush shall be removed, digging out stumps to a depth of 18 inches. No burning of wood will be allowed, but may be buried on site.

b) All necessary clearing and grubbing shall be done to allow for installation of the new chain link fence.

2.03 POND DRAWDOWN

a) The pond will be drawn down by the General Contractor by use of the existing pond draw down structure which is to be demolished after the draw down.

b) The pond will be drawn down upon notice given the Contractor from the Board of Fisheries and Game and shall be done under their direction and requirements.

2.03 POND DRAWDOWN - Continued

c) It will be the Contractor's responsibility to maintain the water level at an elevation which will insure a dry area for work around the new structure.

d) Cofferdams shall be constructed where necessary as indicated on the plans and specifications, the type of construction shall be at the discretion of the contractor unless otherwise specified. All temporary cofferdam structures shall be removed at the completion of work.

e) The cost of materials, construction and removal of the cofferdams shall be borne by the Contractor and included in the bid price.

2.04 DEMOLITION AND REMOVAL

a) The existing concrete drawdown structure, lift mechanisms and foundations are to be demolished.

b) All concrete and masonry debris may be burned on the site.

c) Metal from lift mechanism and contral gate to be removed from the site.

d) Removal is required for the existing 3'-0" I.D. steel intake pipe. Approximate length 20'-0".

e) Demolition and removal is required for the existing stone headwall at the entrance of the existing intake pipe.

2.05 EARTHWORK

a) Topsoil shall be stripped from all areas affected by construction and stockpiled for future use.

0 EARTHWORK - Continued

b) Excavation shall consist of the removal and disposal of all materials, including rock, to the proper level below finish grades as shown on the plans and sections. Excavated material shall be used as fill if it meets the requirements for fill in those specifications. All excavated materials not suitable or not used for fill shall be disposed of by the Contractor or as directed by the State. Excess excavated material may be deposited on site.

c) Fill shall consist of earth or rock, or a mixture of earth and rock, free of trees, stumps, loam, organic material and frozen material. Fill not available from excavations or borrow pits on the site shall be supplied by the Contractor at the Contractor's expense. Fill shall not be deposited on snow, ice, frozen surfaces or in greater than two (2) foot layers without approval of the State. All fill must be either approved by the State or meet State Highway Department specifications M.02.07 Grading "B". The entire area of each layer of fill material shall be compacted with heavy hauling or grading equipment.

d) All materials shall be compacted to 95% of the modified Proctor Density as defined in ASTM D 1557-64T.

e) Provide shoring, sheeting, bracing, as required subject to the approval of the State.

f) Proper drainage shall be maintained by the Contractor at all times during construction to prevent unnecessary washing and depositing of materials. Special care shall be exercised to prevent damage to adjacent land and Contractor shall correct any damage at no expense to the State.

06 SPILLWAY REPAIR - EXISTING PIPE REPAIR

a) Top of spillway is to be repaired as shown on plans. All spalls and loose concrete is to be removed and holes filled with a neat 3500 PSI grout mixture. All growth and debris to be removed from spillway before repair work begins.

2.06 SPILLWAY REPAIR - EXISTING PIPE REPAIR - Continued

b) Exposed spillway wing walls to receive coat of gray Masonry Paint - Thoro-Seal or approved equal.

c) Repair concrete lining on end of existing pipe for a distance of 3'-0" into pipe with cement grout.

2.07 REMOVAL OF GROWTH FROM FACE OF DAM AND SPILLWAY

a) All heavy growth and brush is to be removed from face of dam and spillway.

b) Spray entire surface with 2-4-D vegetation control chemical or similar brush removal agent as approved by Board of Pesticide Control. Chemical agent selected must have approval of State Board of Fisheries and Game.

2.08 PLACEMENT OF RIP RAP

a) Provide rip rap as called for in contract drawings.

b) Rip rap shall be placed as shown on the plans and sections and shall conform to State of Connecticut State Highway Department Specifications, Sections 7.02 and 7.04.

2.09 CHAIN LINK FENCE

a) This Contractor shall furnish and install chain link fence and gates as shown on plan. Material to be as sold by Anchor Fence Co., Cyclone Fence Co., or approved equal.

b) Fence to be 5' high with 1-5/8" O.D. pipe rail at top.

2.09 CHAIN LINK FENCE - Continued

c) All material to be galvanized. Fabric to be No. 9 gage 2 x 2 mesh, top and bottom, selvages to have twisted and barbed finish. Line posts not further than 10' apart to be 1-7/8" x 1-5/8" H beams. Corner and gate terminal posts shall be 2-1/2" O.D. and 4" O.D. pipe respectively. Top rail shall be 1-5/8" O.D. steel pipe. Bottom of fabric to be reinforced with one strand of suitable coil spring wire. Gate frames shall be 2" O.D. steel pipe. Corner fittings shall be malleable castings or pressed steel. Gate to be equipped with hinges, drop bar and stop, gate keeps, latch and locking device to receive padlock supplied by the owner.

d) All posts setting to be 3'-0" in 2000 psi concrete footings 12" and 8" diameter concrete to extend from 3" above ground (sloped top) to 6" below bottom of posts. Holes shall be clean before placing concrete. (see plans)

2.10 GRASSED AREAS

a) Provide loam, fertilize and seed, lime and mulch cover. For area around footbridge and all areas affected by erection of new chain link fence and existing grassed areas affected by construction or construction equipment.

b) Spread existing stockpiled topsoil and provide additional loam as required to provide a 6" layer of loam over the areas so designated. Loam material shall conform to the requirements of M13.01 of the Standard Specifications of the Connecticut State Highway Department. Construction methods shall conform to Section 9.44.03 of the above referenced Specification.

c) Fertilizing and seeding shall conform to the requirements of Section 9.45 Type I of the above referenced Specification.

d) Liming shall conform to the requirements of Section 9.46 of the above referenced Specification.

OUTLINE SPECIFICATION

FOR

REPAIRS TO

BESECK LAKE DAM
MIDDLEFIELD, CONNECTICUT
PROJECT BI-BB-75

BY

MACCHI AND HOFFMAN, ENGINEERS
44 GILLETT STREET
HARTFORD, CONNECTICUT

NOVEMBER 1970

Comments Requested
11-4-70

item 7?

OUTLINE

TABLE OF CONTENTS

ITEM 1. GENERAL SCOPE OF PROJECT

For Preliminary submission the general scope of this project is prepared in the form of two schemes in order to present study and obtain comments on alternate methods of repair and construction.

A. Scheme A Outline

1. Remove existing concrete water control structure and wood bridge.

2. Erect new water control structure and bridge near the upstream face of the dam.

3. Perform required new work and repair work to the general site and dam as presented in plans and specifications.

B. Scheme B Outline

1. Abandon existing concrete water control structure.

2. Provide a new pressure gate structure on the downstream face of the dam.

3. Construct a new water level control weir at the south end of the spillway.

4. Provide a new pressure grout sealed 16" diameter pipe from the new pressure gate to the existing water control structure through the existing pipe.

5. Perform required new work and repair work to the general site and dam as presented in plans and specifications.

ITEM 2. SITEWORK

Provide labor and material to complete the following work:

A. Tree Removal.

B. Brush and growth removal from face of dam.

C. Erection of new chain link fence and gate.

D. Repair surface of existing concrete spillway.

E. Paint exposed concrete surfaces with Thoro seal.

F. New 4" crushed stone on upstream face at existing spillway and around new water level control weir.

G. Loam and seed any areas at the top of dam, side of road or within the construction area that were damaged during construction.

H. Materials requireing compaction shall be compacted to 95% of the modified Proctor Density.

I. Shoring, sheeting and bracing as required subject to approval of State and Engineer.

ITEM 3. EXCAVATION, REMOVAL AND BACKFILL

Provide labor and materials to complete the following work:

A. Remove the existing drawdown structure.

B. Remove existing wood footbridge.

C. Remove and excavate stone and earth for new weir control structure at south end of spillway.

D. Excavate and backfill as required for new water level control structure and new pressure gate structure.

E. Remove and modify the existing pipe as required to fit new pressure gate and new control structure.

ITEM 4. CONCRETE

A. Cement - Portland cement, Type 1 or 2 conforming to ASTM Specification C-150.

B. Aggregate - Conforming to ASTM Specification C-33.

C. Reinforcing Steel - ASTM A-615 - G-40.

D. Mix Design - Concrete to test not less than 3,500 lbs. per square inch at 28 days.

ITEM 5. WATER CONTROL GATE AND LIFT ACCESSORIES

A. Gate to be 30" diameter or 24" diameter (as shown in drawings) series 160, frame sluice gate, cast iron construction, fully bronze mounted as manufactured by the Rodney Hunt Company or approved equal.

B. Gate shall be able to withstand 20 foot of unseating head.

C. Stem to be 1-3/4" dia. stainless steel with stop collar, trust nut, stem guides and coupling. Stem cover to be clear plastic.

D. Lift mechanism to be crank operated floorstand type, model S-5002 as manufactured by the Rodney Hunt Company or approved equal.

E. Wall thimble to be 8" deep of cast iron construction.

F. Studs, nuts and anchor bolts to be stainless steel.

ITEM 6. STRUCTURAL STEEL AND MISCELLANEOUS METALS

A. Structural steel to be ASTM A-36 and is not limited to the following areas:

1. New footbridge steel.
2. Gate house lintels and support angles.
3. Pedestal support platform.
4. Stem guide support and bracing members.
5. Weir board support frame.
6. Door frame.
7. Fence line posts.

B. Pipe Rail - to be ASTM Schedule 40, 1-1/2' dia.

C. Floor Grate - Type AA, hot dip galvanized as manufactured by Irving Grating Co.

D. Bridge and Platform Grate - to be Irving "Gripweld" or approved equal, hot dipped galvanized.

E. Steel Pipe - 16" I.D. ASA conforming to ASTM A-53 (weldable).

ITEM 7. PRESSURE GROUTING

Provide labor and materials to complete the following work.

A. Install new 16" diameter steel pipe through existing pipe as shown on plans.

B. Provide a 2½"± continuous pressure grouted seal around pipe to insure a water tight surface.

C. Contractor shall furnish all labor and material for the performance of a pressure test on the steel pipe as may be required by the authorized inspectors having jurisdiction or as may be required by the Engineer or his authorized representative.

ITEM 8. MISCELLANEOUS

A. Metal door with louver with lock, butts and frame.

B. 8" concrete block for new gatehouse walls conforming to ASTM Specifications.

C. Paint new gatehouse, bridge, grating, railing and fencing with two coats of rust inhibitive paint.

D. Lock for weir board frame.

E. Ladder rungs.

F. Anchor bolts and plates as shown on drawings.

NTERDEPARTMENT MESSAGE

SAVE TIME: *Handwritten messages are acceptable.*
Use carbon if you really need a copy. If typewritten, ignore faint lines.

TO-201 12-69

O Charles I. Sweeney Commissioner	AGENCY Department of Public Works	DATE November 12, 1970
RO harles J. Pelletier Division Engineer	AGENCY Water Resources Management Water Resources Commission	TELEPHONE 4684

UE ECT
Repairs to Beseck Lake Dam, Middlefield, Connecticut

In accordance with your oral request of November 4, 1970, we have reviewed the plans for Scheme A, improvements to subject dam and have the following comments.

On Drawing No. 2 there is shown an existing 36 inch iron pipe to remain which extends from the bottom of the lake to the existing and the new gate house control structure. There is also shown extending from that structure through the dam to the downstream side of the dam a pipe identified as an existing 33 inch diameter pipe to remain. The difference in the apparent size of these pipes on the drawing does not correspond to the indicated sizes of the pipe. Correction of this fact may affect your decision regarding the relocation of the upstream 36 inch pipe so that the flow lines will correspond.

We note that the control structure well is over 20 feet deep and in order to control water levels it will be necessary for someone to enter and place weir boards which we presume would normally extend to within five feet or so of the top of the control well. However, in order to lower the lake level a substantial distance it will be necessary for someone to enter the well and remove these boards to a much lower elevation. As the design is now drawn, this will have to be done working from ladder rungs set in the concrete on the side of the well structure. This is a rather difficult maneuver, and it is suggested that the design be adjusted to permit the use of a ladder in the well. This would require then an access manhole be located in such a position that a ladder can be introduced into the well without interference of the roof and shed which is now planned to construct on top of the well. In any case the manhole access should be moved to the position off center of the cover on the well so that one edge of the opening coincides with the inside surface of the well on which the ladder rungs will be mounted.

We presume that these plans are in the nature of preliminaries since some details are not properly shown. For instance the shaft on the gate lifting rig should be sleeved through the control house floor.

Division Engineer
Water Resources Management

CJP:d

SAVE TIME: *If convenient, handwrite reply to sender on this same sheet.*

M. G. Warner — Engineering - Public Works — January 26,
Chief Engineer

William H. O'Brien III — Water Resources Commission — 566-5506
Civil Engineer

Beseck Lake Dam, Middlefield

The following are our comments on your memo of January 20, 1971 and plans dated January 6, 1971 for the repair of the subject dam.

1. On drawing #2 there is an indication of a 12" C.I. pipe to be abandoned. The entire length and end conditions should be shown and it would appear best to fill with concrete if it is to be abandoned.

2. It is assumed that a sleeve will be placed through the concrete floor for the gate stem. This detail is not indicated on drawing #5, detail (1/5).

When these items have been resolved, we will again consider this application.

William H. O'Brien III
Civil Engineer

WHOIII:lch

INTERDEPARTMENT MESSAGE

STO-201 12-69

SAVE TIME: *Handwritten messages are acceptable. Use carbon if you really need a copy. If typewritten, ignore faint lines.*

TO	AGENCY	DATE
File	Water & Related Resources	April 11, 1
FROM	**AGENCY**	**TELEPHONE**
Victor F. Galgowski Supt. of Dam Maintenance	Water & Related Resources	

SUBJECT: Beseck Lake Dam, Middlefield 1 C28.5M0.8C07.2ED1.2

This site was inspected on April 7, 1972. The repairs to the structure during the past year place this dam in a safe condition. The only work remaining to be done is the seeding of grass near the recently installed chain link fence and an area on the upstream side of the dike between the footbridge to the gate house and the north spillway abutment.

Very little water was flowing over the spillway. No leaks were noted in the face of the dam.

There was no lock in the ten foot gate leading to the dam. A group of small children playing on top of the dam were asked to leave. It will be suggested to the Department of Environmental Protection Area Manager, District 3 that a lock be placed in this gate to prevent trespassing on the dam.

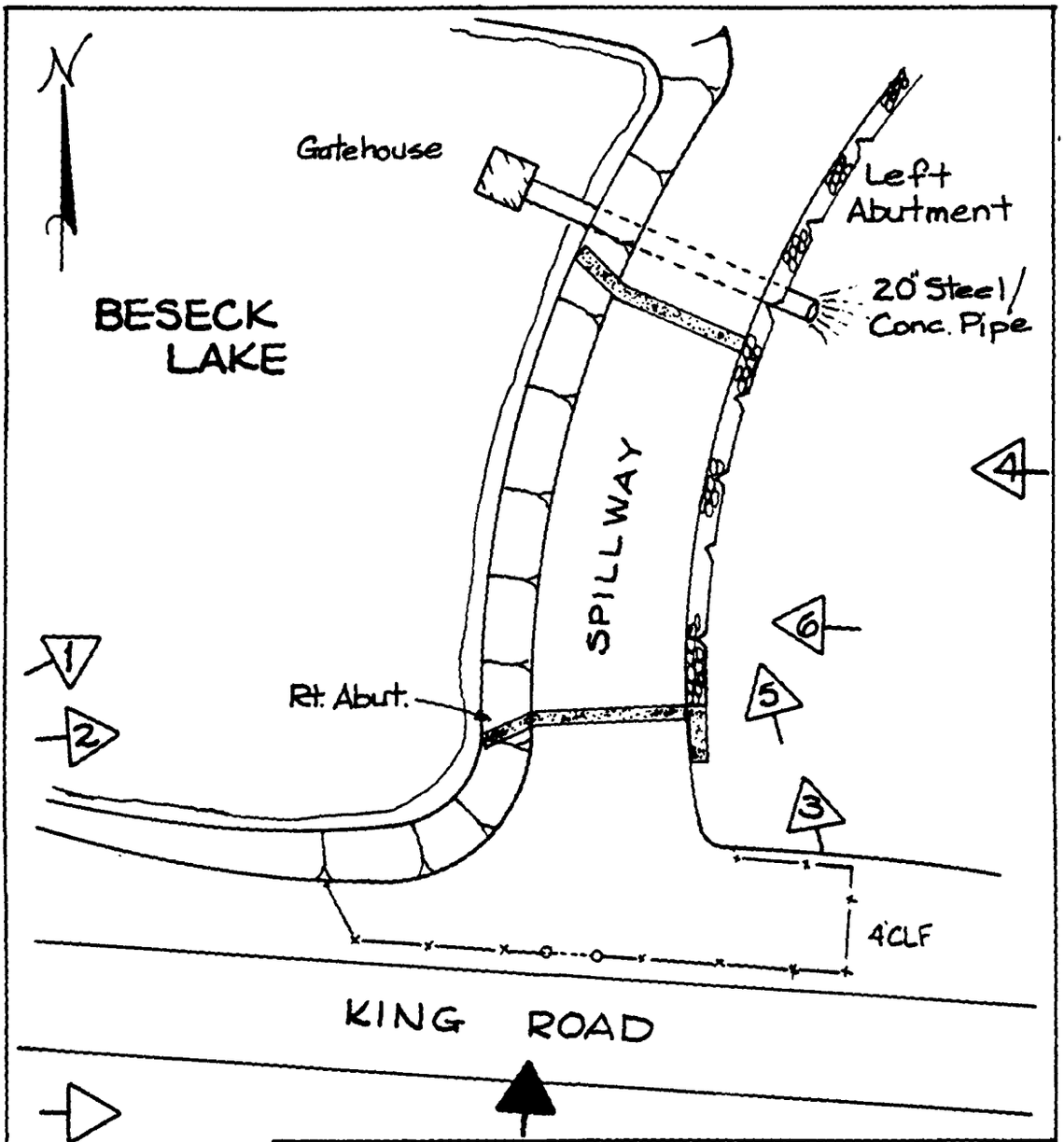
Victor F. Galgowski
Supt. of Dam Maintenance

VFG:ljg

SAVE TIME: *If convenient, handwrite reply to sender on this same sheet.*

APPENDIX C

SELECTED PHOTOGRAPHS



Appendix "C" Photos.

Overview Photo

LOUIS BERGER & ASSOC., INC WELLESLEY, MASS. ARCHITECT · ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

BESECK LAKE DAM

SKETCH PLAN SHOWING LOCATION & ORIENTATION OF PHOTOS

STATE - CT.

			SCALE 1:24000
			DATE

BESECK LAKE DAM

1. Left abutment area and gatehouse

2. Spillway and right abutment

BESECK LAKE DAM

3. Downstream face, spillway and left abutment

4. Pond and small dam on Ellen Doyle Brook, from Rte. 147 bridge

BESECK LAKE DAM

5. Growth on downstream face. 20 in. dia. outlet (right) and 12 in. dia. abandoned outlet (left).

6. Downstream face and 12 in. dia. abandoned outlet.

APPENDIX D

HYDROLOGIC & HYDRAULIC COMPUTATIONS

BY _____ DATE 12-30-71

CHKD. BY _____ DATE _____

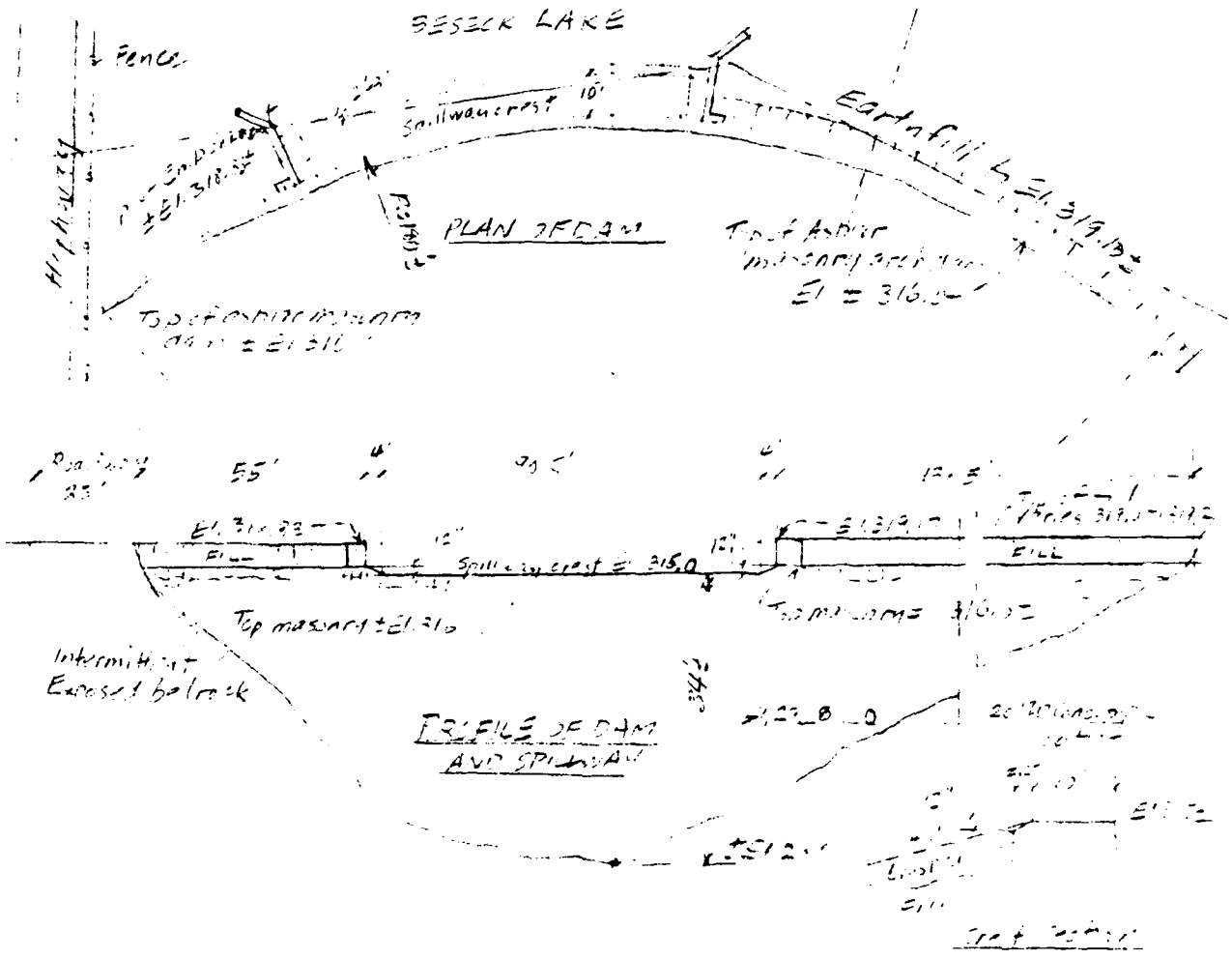
SUBJECT BESECK LAKE DAM. LAYOUT

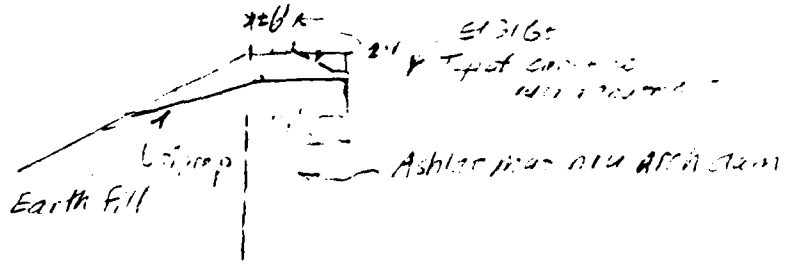
LOUIS BERGER & ASSOCIATES INC.

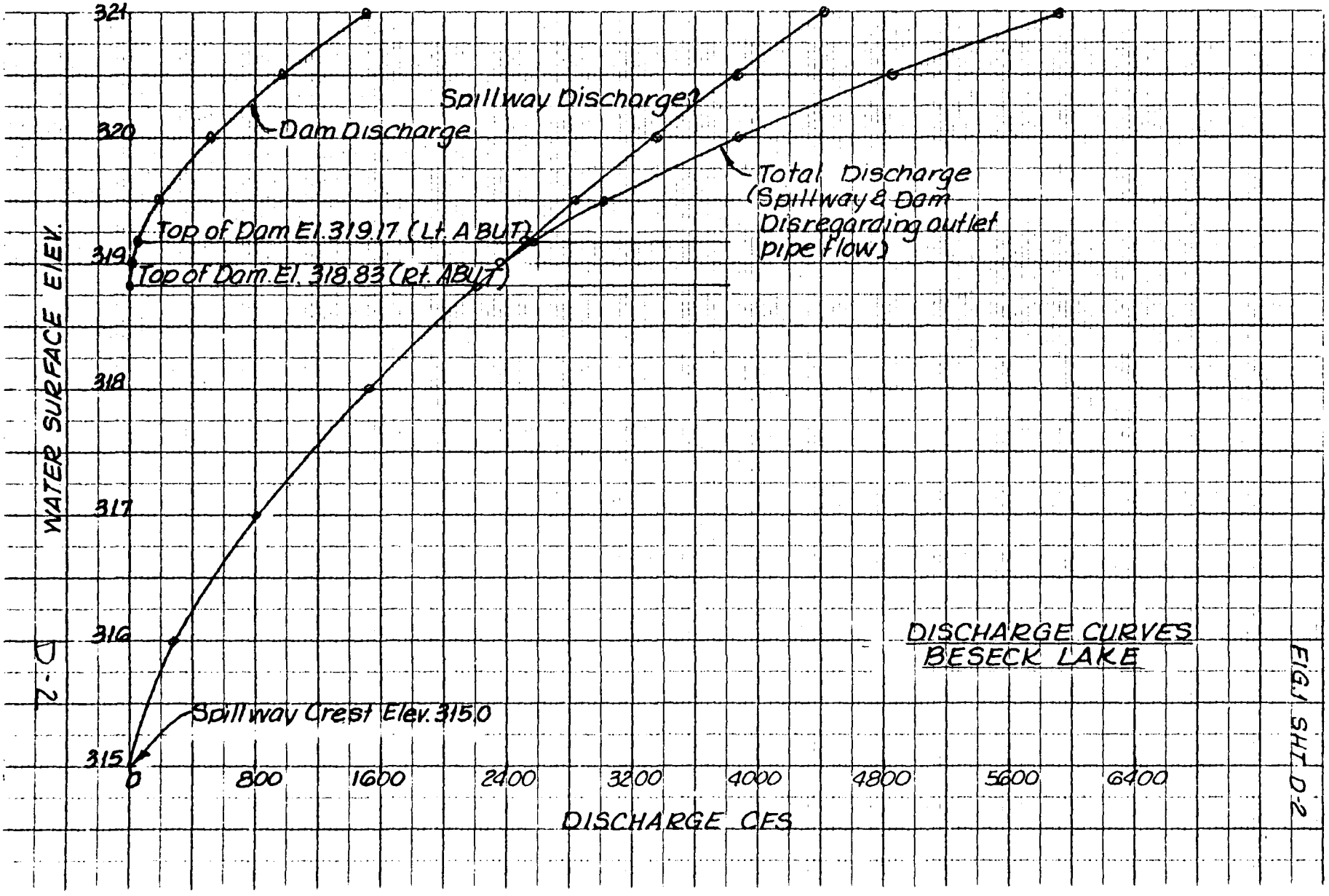
SHEET NO. D-1 OF _____

INSPECTION OF DAMS OF CONNECTICUT

PROJECT _____







DISCHARGE CURVES
BESECK LAKE

D-2

FIG. SHT D-2

LOUIS BERGER & ASSOCIATES INC.

BY [illegible] DATE 12-30-7[illegible] SHEET NO. D-3 OF [illegible]

CHKD. BY [illegible] DATE [illegible] [illegible] PROJECT [illegible]

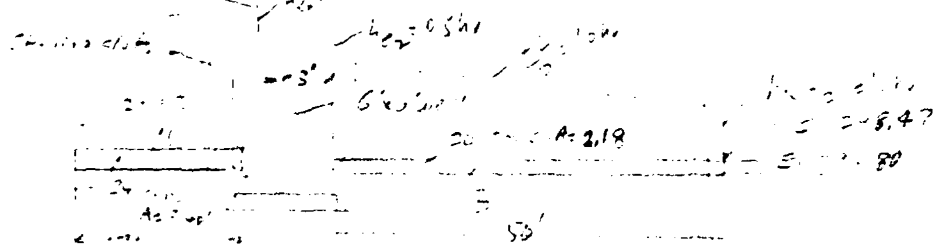
SUBJECT [illegible] DISCHARGE CURVES

SPILLWAY — RIGHT ABUTMENT — LEFT ABUTMENT

Elev	H	C	q/ft	Q (Spillway Sec. 1 L=90.5)	Area/ft	ΔQ (Sec. 2 L=8)	Total thru Spillway	Right Abut. H	C	ΔQ	Left Abut. H	C	ΔQ	Total over Abut.
315	0			0		0	0							
316	1.0	3.0	3.00	272	1.50	12	284							
317	2.0	3.01	8.48	767	5.74	46	813							
318	3.0	3.02	15.69	1422	12.27	96	1518							
318.3	3.3	3.04	22.74	2062	18.56	149	2211	0		0				0
319	4.0	3.04	24.32	2200	20.00	160	2360	0.7	2.6	15				15
[illegible]	4.?	3.05	[illegible]	2350	21.50	172	2522	0.83	2.[illegible]	40	0			40
319.5	4.5	3.06	27.21	2466	24.52	[illegible]	2640	[illegible]	2.6	164	0.33	[illegible]	15	[illegible]
320	5.0	3.08	34.44	[illegible]	29.33	235	3351	1.[illegible]	2.[illegible]	293	[illegible]	[illegible]	2[illegible]	522
320.5	5.5	3.08	37.93	3576	34.07	273	[illegible]72	[illegible]7	2.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
321	[illegible]	3.08	[illegible]	4097	37.85	[illegible]	[illegible]	[illegible]	2.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

↑ Total discharge — Spillway and dam spillway

OUTLET PIPE



Q	Pipe ① V	h_v	Losses $1.75h_v$	Pipe ② V	h_v	Losses $2.5h_v$	Total Losses	Res. W.S.
20	6.37	0.63	1.10	9.17	1.31	3.27	4.36	302.8
25	7.96	0.1[illegible]	1.72	11.47	2.04	5.11	6.83	305.3
30	9.55	1.42	2.48	13.76	2.94	7.35	9.83	308.3
35	11.15	1.93	3.38	16.06	4.00	10.00	13.34	311.9
40	12.74	2.52	4.41	18.35	5.23	13.07	17.48	315.9
45	14.33	3.19	5.58	20.64	6.62	16.54	22.12	320.6
50	15.92	3.94	[illegible]	22.94	8.17	20.42	27.31	325.8

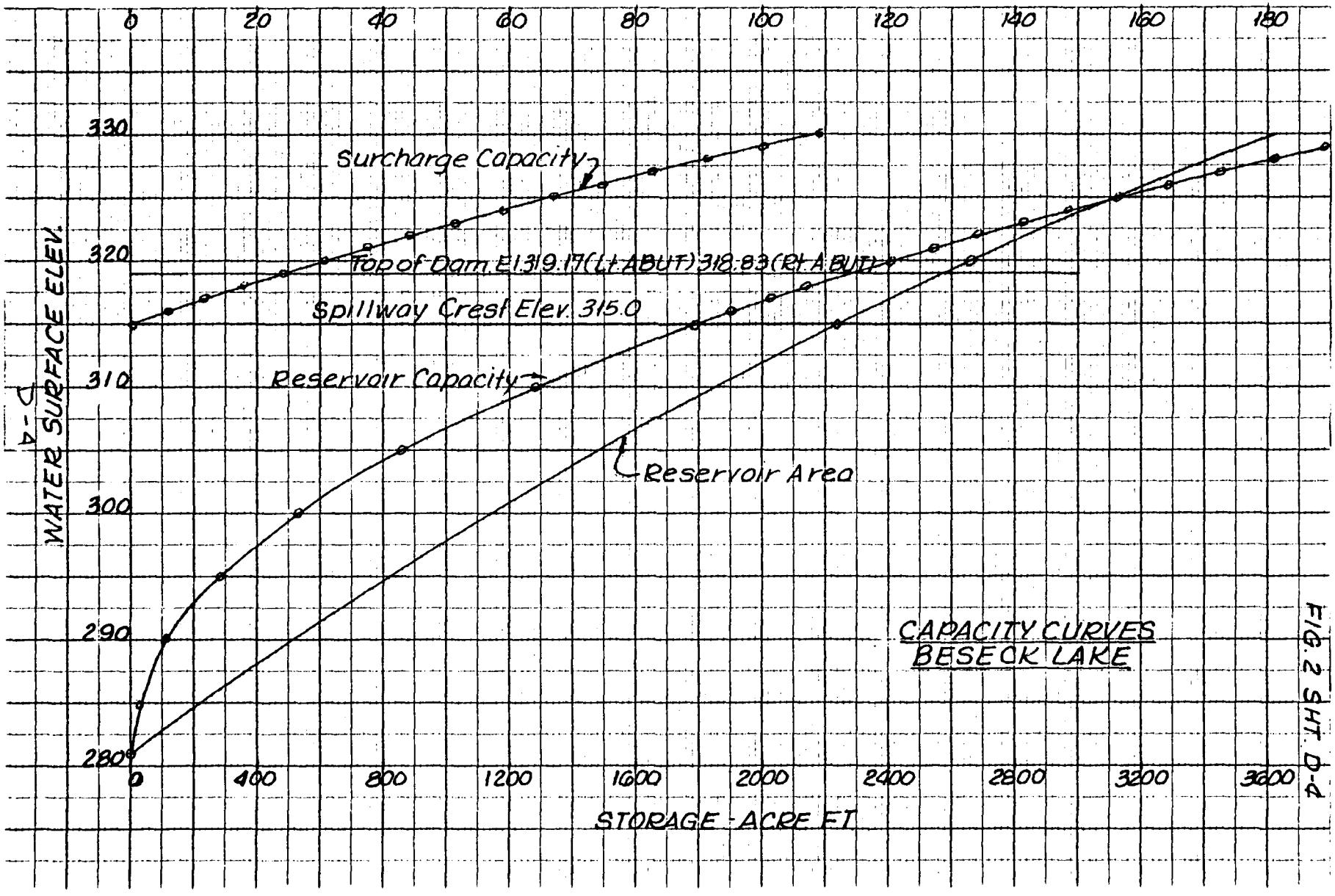
Note – Above discharge is with no [illegible]

Head over stoplogs for 50 cfs = $\left(\frac{50}{6.0 \times 3.2}\right)^{2/3}$ = [illegible]

For 35 cfs = 1.5'

For 20 cfs = 1.0'

D-3



CAPACITY CURVES
BESECK LAKE

FIG. 2 SHT. D-4

D-4

BY S.A.S. DATE 1/2/79. **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. D-5 OF.

CHKD. BY ____ DATE ____ BESECK LAKE DAM PROJECT W-189

SUBJECT ____

RESERVOIR CAPACITY CURVES

Elev.	Area (Acre)	Av. Area (Acre)	Height (Ft.)	Storage (Acre Ft.)	Cumulative Storage (Acre Ft.)	Surcharge Storage (Acre Ft.)	Remarks
281	0						El. 281 ± : Area = 0
285	11.5	5.8	4	23	23		
290	26.0	18.8	5	94	117		
295	41.0	33.5	5	168	285		
300	57.5	49.3	5	247	532		
305	74.5	66.0	5	330	862		
310	92.5	83.5	5	418	1280		
315	112.0	102.3	5	512	1792	0	El. 315.0 Spillway Crest
316	116.0	114.0	1	114	1906	114	
317	120.0	118.0	1	118	2024	232	
318	124.5	122.3	1	122	2146	354	El. 318.83 Top of Dam Ft
319	129.0	126.8	1	127	2273	481	El. 319.17 " " Lt
320	133.0	131.0	1	131	2404	612	
321	137.5	135.3	1	135	2539	747	
322	142.0	139.8	1	140	2679	887	
323	146.5	144.3	1	144	2823	1031	
324	151.0	148.8	1	149	2972	1180	
325	156.0	153.5	1	154	3126	1334	
326	161.0	158.5	1	159	3285	1493	
327	166.0	163.5	1	164	3449	1657	
328	171.0	168.5	1	169	3618	1826	
329	176.0	173.5	1	174	3792	2000	
330	181.0	178.5	1	179	3971	2179	

DRAINAGE AREA 2.05 sq. mi. = 1312 acres
Reservoir area 112 acres = 8.5 % of DA
Reservoir capacity at Normal storage —
Spillway Crest El. 315.0   Res length 0.9 mi
Res width 0.2 mi

[illegible]

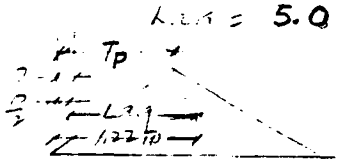
Length 0.9 mi width 2.3 mi.
5 tributaries into Lake.

1.	L = 5000'	H = 425 - 315 = 110	S = .022	S = 116'/mi
2	4200	655 - 315 = 340'	.081	428
3.	3000	670 - 315 = 355'	.118	623
4.	4000	490 - 315 = 175	.044	232
5.	3200	370 - 315 = 55	.017	91
average	3880' = 0.74 mi		Average	298'/mi

$L_{ca} = K\left(\frac{L L_c}{\sqrt{S}}\right)^{.33} = K\left(\frac{.74 \times .74}{\sqrt{298}}\right)^{.33} = 0.25K$

Snyder's B average = 5.0

$L_{ca} = 5.0 \times 0.25 = 1.25$ hrs



$1.22 T_p = L_{ca} - \frac{D}{2}$

$.4D + 0.82 L_{ca} = T_p$

$D = 1.0$ hrs $T_p = 0.41 + .82 \times 1.25$ 1.44

Say $T_p = 1.5$ hr

Check for velocity

Average Length = 3880' $v = \frac{L}{3600 L_{ca}} = 1.1$ ft/s = ≅ 1.0 [illegible]

O.K.

Now V_p = Peak rate in cfs

$= \frac{484 A Q}{T_p} = \frac{(484)(2.05)(1.0)}{1.5} = 662$ cfs

PMP = Probable Max. Precip.
= (24")(0.8) = 19.2" for Connecticut
= 19 in" considering infiltration

BY PEC DATE 2/14/79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. D-7 OF

CHKD. BY DATE PROJECT

SUBJECT BESECK LAKE DAM

FLOOD HYDROGRAPH FOR PMF

TIME (Hours)	Rainfall (%)*	Rainfall Inches	QP (cfs)	Begin Time	Peak Time	End Time
0.0						
1.0	10	1.88	1245	0	1.5	4.0
2.0	12	2.26	1496	1.0	3.5	5.0
3.0	15	2.82	1867	2.0	3.5	6.0
4.0	38	7.14	4727	3.0	4.5	7.0
5.0	14	2.63	1741	4.0	5.5	8.0
6.0	11	2.07	1370	5.0	6.5	9.0
		18.80	12446			

$1.67\ T_p - T_p$

* Distribution of Maximum 6 [illegible] SPS of PMP in Percent at 6 hour [illegible] T per

EM 1110-2-1411

FIG. 3 - SHEET D-8

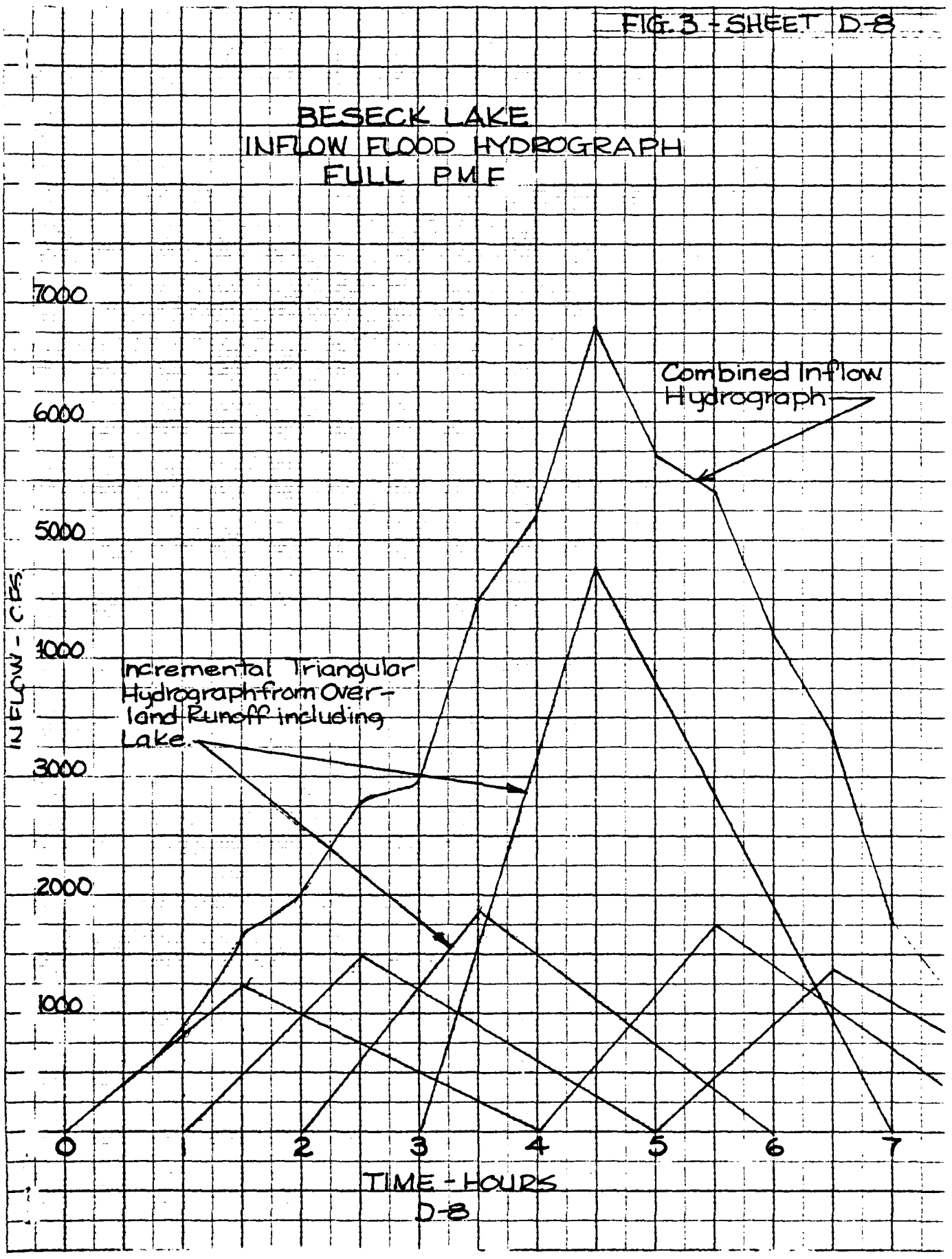
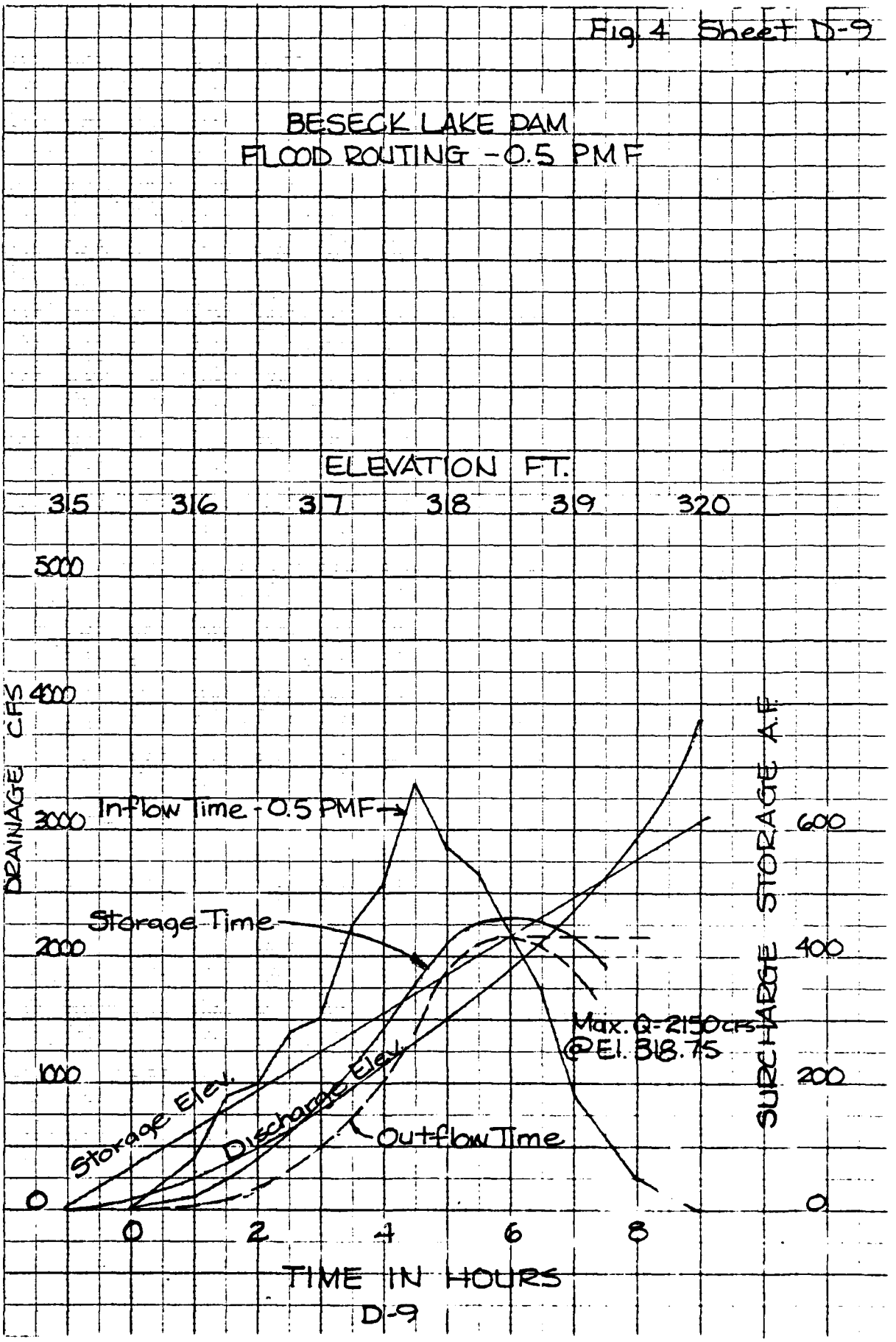


Fig. 4 Sheet D-9

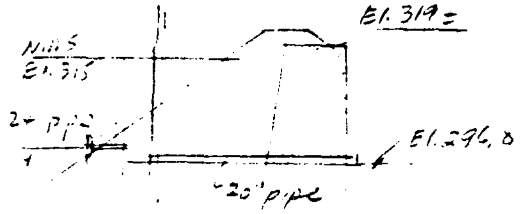


BY JH DATE 1-11-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. D-12 OF

CHKD. BY ______ DATE ______ INSPECTION OF DAMS - CONN. & R.I. PROJECT ______

SUBJECT BESECK LAKE DAM - HYDRAULICS

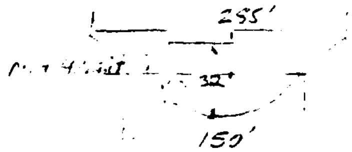
EVACUATION TIME OF RESERVOIR THRU OUTLETS



Invert El. 290 ±

Res. El.	Average Outlet Disch. cfs	Reservoir Storage	Δ Storage	Evacuation time-Days
315		1792		
312	37.5	1470	322	4.3
309	32.5	1200	270	4.2
306	27.5	940	260	4.7
303	22.5	720	220	4.9
300	17.5	530	190	5.5
297	15	425	105	3.5
			Total	27.2

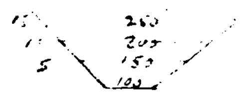
PEAK FAILURE OUTFLOW BY RULE OF THUMB PROCEDURE



Gap width = 0.4 × 150' = 60'

$Q = \frac{8}{27} W \sqrt{g}\, y^{3/2} = \ldots$

STAGE-DISCHARGE IN ELLEN DOYLE BROOK BET. SPILLWAY AND RR. OVERPASS



$S = \frac{20}{800} = 0.025$

d	ΔA	ΣArea	W.P.	r	$r^{2/3}$	Q
0	0	0				0
5	625	625	151.0	4.14	2.58	2400
10	875	1500	202.0	7.43	3.81	17700
15	1125	2025	253.0	11.34	4.70	36700

BY ____ DATE 6-11-71 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. D-11 OF ____

CHKD. BY ____ DATE ____ INSPECTION OF DAMS CONN RC PROJECT ____

SUBJECT RESERVOIR LAKE DAM - HYDRAULICS - DENNISTEAM CHANNEL

RIVER FLOW AT PENNCENTRAL CROSSING

OF COGINCHAUG RIVER

CHANNEL WIDTH = 100' - Vertical Abutments

$\frac{h_{vc}}{d_c}$ / Rectangular

Assume $\frac{h_{vc}}{d_c} = 1.2$

CRITICAL FLOW

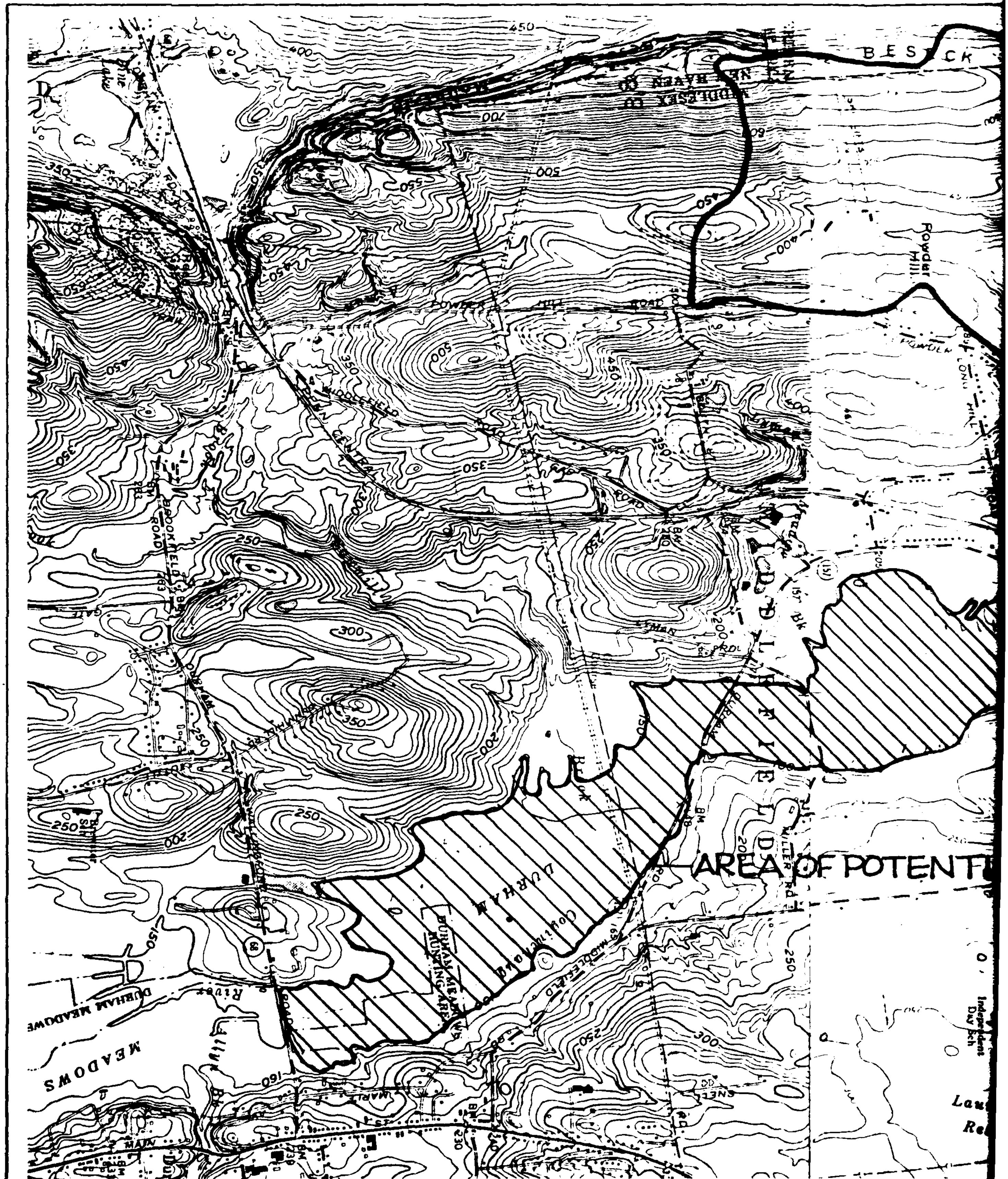
$V_c = 5.67 \frac{A}{T}$

Depth Ft	Area sq ft	Top width Ft	A	V_c	h_{vc}	$d_c + h_{vc}$	Q_c
1	100	100	100	5.67	0.5	1.5	567
2	100	100	200	8.02	1.0	3.0	1604
3	100	100	300	9.82	1.5	4.5	2946
4	100	100	400	11.34	2.0	6.0	4536
5	100	100	500	12.65	2.5	7.5	6325
5.5	50	100	550	13.30	2.75	8.25	7314

COGINCHAUG RIVER FLOW AT WADSWORTH FALLS

Critical Flow $\frac{Q^2}{g} = \frac{A^3}{T}$

Depth	T	Δ Area sq ft	Σ Area sq ft	Q_c	V_c	h_{vc}	$d_c + h_{vc}$	Comment
1	44	—	0	0				
2	138	145	145	983	6.64	0.69	2.69	242.69
3	136	122	270	2159	8.00	0.94	3.94	2393.69
4	168	152	422	3795	9.00	1.26	5.26	2401.26
5	200	184	606	5985	9.88	1.52	6.52	2406.52
6	224	212	818	8870	10.84	1.83	7.83	2407.83
7	248	236	1054	12330	11.70	2.13	9.13	2409.13
8	272	260	1314	16358	12.47	2.42	10.42	2510.42



AREA OF POTENT
Powder Hill
MEADOWS
DURHAM MEADOWS
DURHAM
MIDDLESEX CO
NEW HAVEN CO

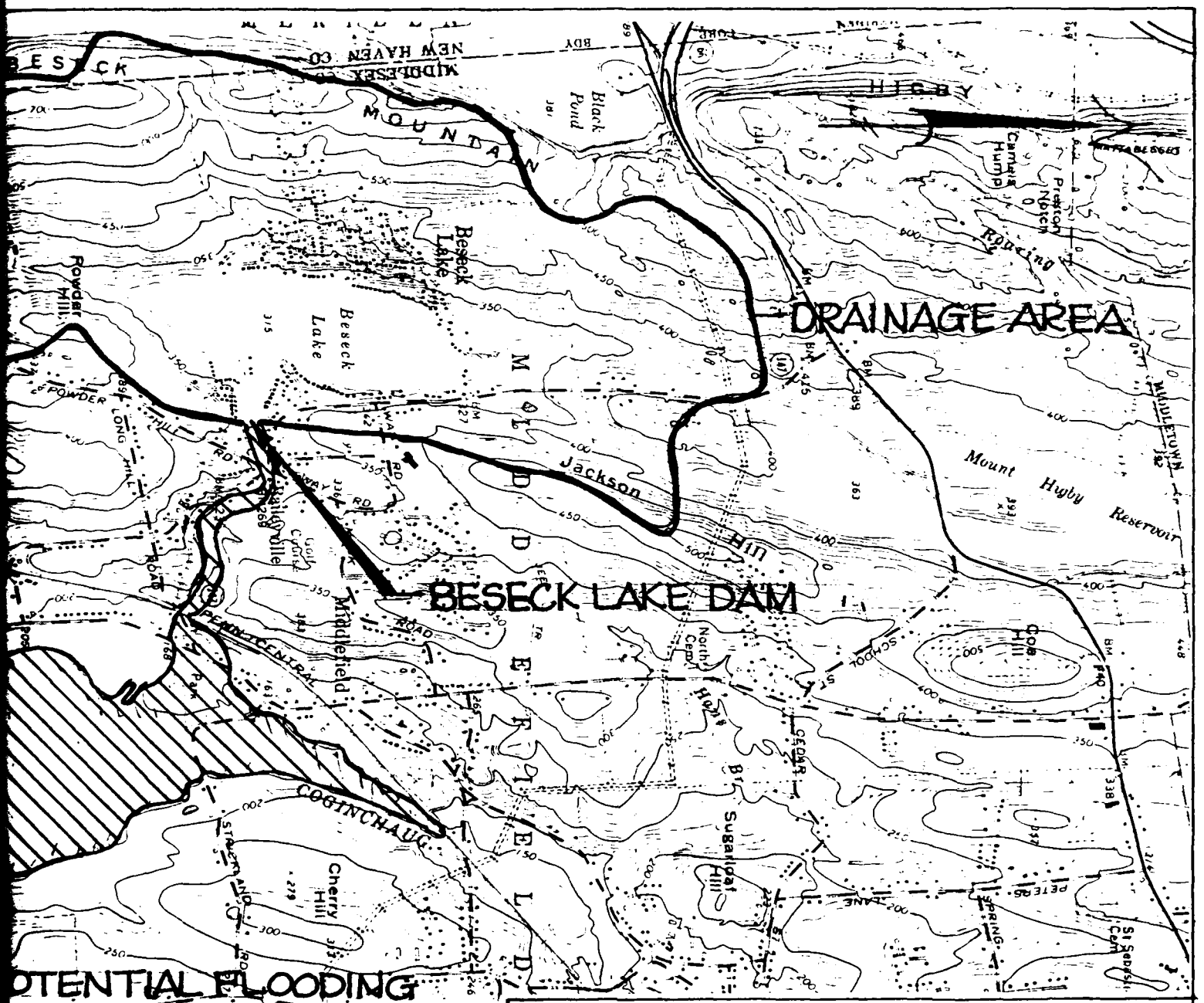


Figure 5, D-12

2

APPENDIX E

INFORMATION AS CONTAINED IN THE

NATIONAL INVENTORY OF DAMS